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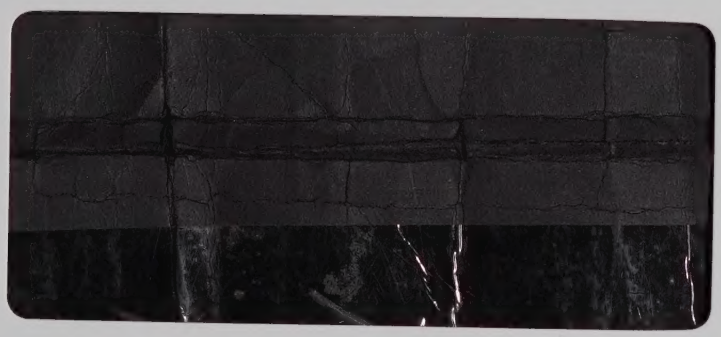

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WILCOM PRODUCTS, INC.
OPERATING INSTRUCTION MANUAL

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T308
PCM CHANNEL ACCESS SET
OPERATING INSTRUCTIONS/APPLICATIONS
MANUAL

T350

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1.0 INTRODUCTION

The Wilcom T308 PCM Channel Access Set is used to test, align and maintain Digital Channel Banks, Digital Switches, Multiplexers, Digital PBXs and T1 carrier systems. It is particularly useful in pre-cutover testing of these systems. A full featured test set, the T308 provides complete DS1 bit-stream receive and transmit functions and encoding/decoding of timeslot information.

Operation of the set is a simple task, as each operating mode is menu-selectable; english-like prompts are presented on a bright blue vacuum-fluorescent display. Entry and modification of operating parameters is simplified through the use of logically-grouped keys.

As a stand-alone instrument, the T308 performs the following tests and measurements:

-- Precise, direct digital measurement of voice-frequency signal amplitude and frequency, as well as PCM offset.

-- A and B signaling-bit control and display of the operational status of all 24 channels.

-- Audible channel monitoring through the integral monitor speaker.

-- Indication of Transmit and Receive status:

  -- Bipolar Violations
  -- Out-of-frame/Out-of-synchronization
  -- Loss of transmit or receive signal

-- Frame-error counting (1-9999).

The transmit and receive functions allows channel-bank testing and alignment on an individual channel basis. In the **Drop and Insert mode**, the T308 is essentially in series with the PCM bit stream. Incoming information in a particualr timeslot is removed (DROP) and new information is substituted (INSERTED) for transmission in the timeslot. All other channels are passed through without change. In **Originate mode**, the T308 generates a DS1 bit stream and allows information to be encoded onto one of the 24 channels. An integral, programmable tone generator, an external analog source, or a direct binary code can be assigned to any channel. Additional operating functions allow T-line monitoring and loop-back operation.

1.1 T350 T1C Multiplexer Option

The testing and measurement cababilities of the T308 can be extended to include T1C systems operating at the DS1C rate (3.152 Mb/s) through the addition of the T350 T1C Multiplexer (Model T308-05).

The T308-05 retains all testing cababilites of the T308 in DROP and INSERT and ORIGINATE modes. Dual multiplexers provide independent DS1-to-DS1C and DS1C-to-DS1 conversion for both transmit and receive functions. In addition, the T308-05 has front-panel indicators which provide status information on Bipolar Violations, Framing Errors and Remote Alarms. A BPV injection function allows testing of BPV correction and alarm equipment by inserting BPVs at a rate of three per second when activated.

Designed to mount on top of the T308, replacing the top cover, the T308-05 combination forms a compact solution for testing and aligning T1/T1C PCM systems.

1.2 Using this Manual

This manual provides operation and applications information for the T308 PCM Channel Access Set and the T350 T1C Multiplexer option. There are five sections to this document. Sections 1 and 2 provide basic information and specifications on the equipment. There have been various models of the T308; the following section (1.3) describes these models. Section 3 describes the function and use of each control, indicator and jack on the T308 and T350. In Section 4, general operating information for each set is given. New users should read this section carefully before attemping to operate the equipment. Specific applications for the T308 and T350 are shown in Section 5, with diagrams showing the connection configurations.

1.3 T308 Model History

There have been various models of the T308 since its inception. The current model is the T308-01A, software version 1.5. Below is a list of the various versions and a description of physical and/or operational differences.

Model	Differences	Initial Offering Date
T308	No internal VF measurement, BPV or Framing Error indication.	1981
T308-01	VF level and frequency added	1982
T308-01	Loop timing, metalic path at power fail in D&I mode added.	1984

Model	Differences	Initial Offering Date
T308-01A	BPV and framing error functions added. (Software version 1.4)	1985
T308-02A	48-volt supply option of -01A version.	1985
T308-03A	Same as T308-02A except provides Bantam jack access.	1985
T308-04A	Same as T308-01A except provides Bantam jack access.	1985
T308-05	Same as T308-01A except adds T350 T1C Multiplexer option.	1985
T308-xxBT	Adds BRIDGE/TERMINATE selection for the digital inputs and outputs on the selected model.	1985

2.0 T308 SPECIFICATIONS

2.1 Receive

Analog:

u255 decoding law
Normal - 7-5/6 bit decoding
CCIS - 8 bit decoding

Output Level:

0 dBm ±0.05 dB with digital milliwatt applied to selected channel.

Output Level vs Frequency:

(Referenced to 1000 Hz) ±0.125 dB for 300 <f<3000 Hz.

Gain Tracking Error:

(L = output level in dBm)

±0.0 <L≤3.0	±0.1 dB
-40 <L< 0	±0.05 dB
-50 <L< -40	±0.15 dB
-60 ≤L< -50	±0.4 dB

Output Intrinsic Noise:

(with forced idle channel code)
<10 dBrnC

Output Impedance:

600 ohm balanced (for use with local measurement equipment such as Transmission Measuring Set (TMS) with balanced input only).

Output TLP:

0.0 dBm

Output Connector:

type 310 (tip-ring) or Bantam jack

Alarm Detection:

bit 2 = 0 in all channels will produce an alarm display if present for greater than 5 frames.

DC Output:

A or B Outputs: (assume that logic "1" = busy/logic "0" = idle)
Idle Condition = open to ground
Busy Condition = metallic ground (with approx. 40 ohm contact protection resistance)

Output Jack:

310 type (tip = A, ring = B, sleeve = ground) or Bantam type

Digital Input:

Standard DS-1 Code (AMI) at 1.544 mb/s rate.

Input impedance:

100 ohms +10%

Input sensitivity:

Will frame properly at levels from ±300 mV to ±3 volts P-P.

Loop Timing Check:

An "L" will be displayed in the display "FRAME" field if the Digital Xmit Output bit rate and the Digital Receive bit rate do not compare.

Line Measurement Functions:

BPV--(Bipolar Violations) - any one or more bipolar violations will be indicated by a "B" in the FRAME field or when selected from the menu.

Frame Slip Count -- One or more frame bit errors will be displayed. A four-digit count of errors is provided in the LINE MEASUREMENT mode.

Channel Sequence Coding -- selectable for D1D, D2, D3 or D4 (at a DS-1 rate)

Connector:

type 310 (tip - ring) or Bantam jacks

2.2 Receive Level Measurement

a. Input range: +3.0 to -60.0 dBm (the display will show >3.0 or <-61 if this range is exceeded)

b. Measurement Accuracy:

Input range:	Accuracy (dB)
Digital Milliwatt ±0.0 dB	
+3.0 to -50.0 dBm	±0.1 dB
-50.0 to -55.0 dBm	±0.2 dB
-55.0 to -60.0 dBm	±0.5 dB

c. Deviation with Frequency:
±0.02 dB from 20 Hz to 3980 Hz

2.3 Frequency Measurement

a. Frequency Range: 0 to 3990 Hz

b. Accuracy: ±2 Hz

c. Input Level Range: to -60.0 dBm (No high limit on input level)

2.4 PCM Offset Measurement

Average offset (in coding steps) calculated with 1000 8 - bit PCM samples.

2.5 Transmit

Analog: VF input: (intended for signaling/TMS or speech)
Input Impedance: 600 ohms balanced

Input Test Level Point: 0.0 dBm
A 0.0 dBm input signal will result in a 0.0 dB (±0.5 dB) output on a digital basis when measured with an ideal decoder and filter.

Headset Input: will accept type 59 headset (tip-sleeve jacks)
Headset Output Level: nominally -13 dB below the VF input test level point.

Synthesizer (VF Generator) Output:
User Selectable:
Digital synthesizer:
freqeuncy range: 0 - 3990 Hz, 10 Hz steps
(send level: +2.9 - 60.0 dBm ±0.1 dB steps
both user programmable from front panel)
Idle channel code: 11111111 pattern (Quiet Termination) or, with an optional feature, an operator-selected code pattern.

Level Accuracy:

In the range:	dB
0.0 to -40.0 dB	±0.05
-40.0 to -55.0 dB	±0.15
-55.0 to -60.0 dB	±0.20

Frequency Accuracy

In the range:	Hz
10 - 530 Hz	-0, +2
540 - 1330 Hz	-0, +5
1340 - 3990 Hz	±5

Alarm Transmission:
Alarm On: bit 2 suppressed in all channels
Alarm Off: normal operation

A/B Bit Input:
Keyboard or External Control
Keyboard: user selectable logic "1" or "0"
External: tip-ring type 310 jack
tip = A, ring = B, sleeve = ground
tip or ring ground generates "1"
tip or ring open generates "0"

Digital Output:

Standard DS-1 Code (AMI) at 1.544 MB/s rate. ±20 b/s
Output Impedance: 100 ohms ±10%
Output Pulse Level: ±3V P-P Bipolar
Channel Sequence Code: selectable for D1D, D2, D3 or D4 (at a DS-1 rate)
Connector: type 310 (tip-ring)

2.6 Dimensions

13.5" W x 5.2" H x 14.5" L
343mm W x 132mm H z 368mm L

2.7 Weight

15 lbs. 10 oz.
7.1 kilograms

2.8 Environmental

Operating Temperature Range: 0 - 40 °C
Relative Humidity: 0 - 90 non-condensing
Storage Temperature Range: 0 - 70 °C

2.9 Power Requirements

100/220 VAC, 50-60 Hz, or (optionally) 48 VDC.

2.10 T350 T1C MULTIPLEXER OPTION SPECIFICATIONS

2.10.1 T1C (DS1C) Digital Inputs:

Impedance -- 100 ohms; 1000 ohms bridging
Line Rate -- 3.152 Mb/s
Line Format -- Standard T1C line code
Amplitude -- ±300 mV to ±3V peak-to-peak

2.10.2 T1C (DS1C) Digital Outputs:

Impedance -- 100 ohms
Line Rate -- 3.152 Mb/s ±50 b/s
Line Format -- Standard T1C line code
Amplitude -- ±3V peak-to-peak ±10%

2.10.3 T1 (DS1) Digital Inputs/Outputs:

Impedance -- 100 ohms ±10%
Line Rage -- 1.544 Mb/s
Line Format -- Standard T1 line code; compatable and intended for use with the Wilcom T308-01A.

2.10.4 Physical:

1.75" H x 13.5" W x 14" D (T350 only)
6.95" H x 13.5" W x 14" D (T308-05)

2.10.5 Environmental

Operating Temperature Range -- 0 - 40 °C
Relative Humdity -- 0 - 90% non-condensing
Storage Temperature Range -- 0 - 70 °C

2.10.6 Power Requirements:

Power is supplied by the T308.

3.0 T308 PANEL CONTROLS AND CONNECTIONS

3.1 Introduction

3.1.1 This section describes the functions of each switch, jack and display located on the T308 front and rear panel. The description will be broken down into sections relating to power, display, keyboard operation, input/output connections and miscellaneous.

3.2 Power

3.2.1 ON/OFF switch

The power switch is located in the lower right corner of the front panel; application of power may be verified by observing the display.

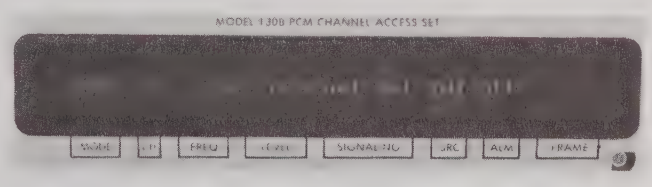
3.2.2 Power Connector

A 115 VAC, three-prong male plug is recessed in the lower-left corner of the rear panel. Sets with the 48-volt power option have a 310 jack and binding posts, located in the lower-left corner.

3.2.3 FUSE

A one-ampere SLO BLO fuse is used in the 117-V model, and a three-ampere fuse is used in the 48-V model. The fuse holder on each model is located in the lower-left section of the rear panel.

3.3 Alphanumeric Display



3.3.1 Introduction

A 40-character, vacuum-flouresent, alphanumeric, blue display provides an english-like interface with the operator. Access parameters as well as measurement parameters are shown on the display. There are three display modes used in T308 operation -- PARAMETER SPECIFY, PARAMETER VIEW and MEASUREMENT VIEW. A typical display is shown above. Each of the display modes is explained below.

a. PARAMETER SPECIFY display mode

This mode is activated when the T308 is initially turned on, or when the SET UP key is pressed. It is characterized by english-like menus, which prompt the operator to press a key corresponding to a selection from the menu. An example of the mode is shown below:

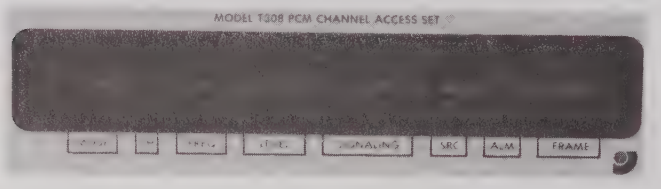


Figure 3-1 -- Example of PARAMETER SPECIFY display mode

b. PARAMETER VIEW display mode

This mode is activated when the DISP and REC or XMIT keys are pressed. Either transmit or receive access parameters will be displayed in this mode. Directly below the display are labels which identify the parameter above the label, as shown in Figure 3-2:

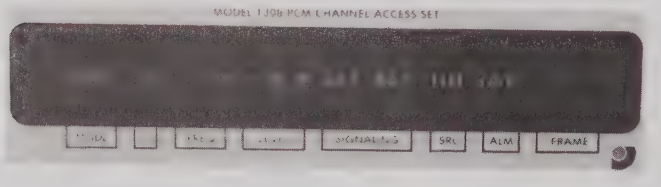


Figure 3-2 -- Example of PARAMETER VIEW display mode

The labels and associated parameter values are as follows:

1. MODE -- Identifies the operating mode of the T308; REC, ORIG, D & I OR LOOP will be displayed above the label, corresponding to Originate, Drop and Insert or LOOP modes.

2. CH -- Identifies the operating channel (1-24) of the transmit or receive side.

3. FREQ -- Identifies the operating frequency of the VF generator (SYNthesizer) when transmit parameters are being displayed and the generator is the send source. If another send source is selected, the name of the source will be displayed (ANALOG, QUIET, HEADSET or THRU). ANALOG is displayed above the FREQ label when receive parameters are being displayed.

4. LEVEL -- Identifies the amplitude level, in dBm, of the VF generator when transmit parameters are selected. The value will be displayed above the label. When receive parameters are being displayed, the word OUT will be displayed above the label.

5. SIGNALING -- Identifies the state of the A and B signaling bits on the selected channel. Above the SIGNALING label will be the symbols A=x B=x, with the x replaced by the current transmit or receive bit state.

6. SRC -- Identifies the source of signaling-bit data; INT or EXT will be displayed above the SRC label when transmit parameters are selected, and REC (referring to the DIGITAL RECjacks) will be displayed when receive parameters are selected.

7. ALM -- Identifies the status of the DS1 alarm mode. When transmit parameters are selected, either ON or OFF will be displayed above the ALM label, indicating whether the alarm is being transmitted or not. When receive parameters are selected, either YES or NO will be displayed above the label, indicating the presence or absense of the alarm condition. (An alarm condition is defined as bit 2 being low in all timeslots.)

8. FRAME -- The display above this label serves different purposes depending on whether receive or transmit parameters are being displayed. If transmit parameters are being displayed, the error letters (described below) are active unless a MODIFY key is pressed; four dashed lines will appear above the label in that case. These lines indicate a parameter modification is in progress. Once the SET key is pressed after the parameter modification is complete, the four lines will disappear, indicating that the modification is complete. If received parameters are being displayed, the error letters B, R, T or L will be displayed above the FRAME label. Each letter signals an error in the DS1 signal:

   B-- Bipolar violations present on the received signal.

R -- Loss of signal or framing at the REC IN jack.

T -- Loss of signal or framing at the XMIT IN jack.

L -- A frequency error exists between two DS1 clock signals being compared. The source of the signals depends on the XMIT mode of the set. In ORIGinate mode, the internal clock is compared against the digital REC IN signal, and in the DROP and INSERT mode, the digital XMIT IN signal is compared with the digital REC IN input.

c. **MEASUREMENT VIEW Display Mode**

In this mode, the alphanumeric display shows the results of measurements made by the T308 receiver section. There are two types of MEASUREMENT VIEW displays -- one when the receive MEASURE LINE option is selected and the other when the receive MEASURE CHANNEL option is selected; an example of each MEASUREMENT VIEW display mode is shown below:

Figure 3-3 -- The MEASURE LINE display format

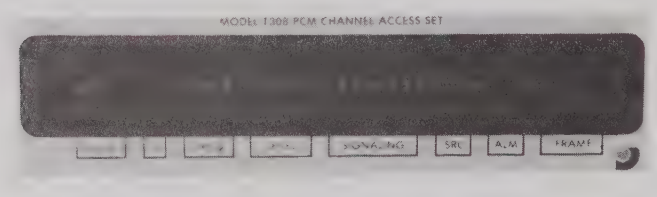


Figure 3-4 -- Example of MEASURE CHANNEL display format

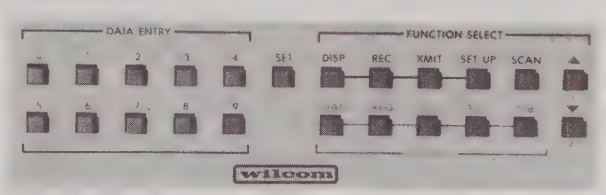
1. MEASURE LINE Display Format

There are two parameters shown in this display mode -- a framing error count and the presence or absence of Bipolar Violations (BPVs). The framing-error counter counts framing errors up to 9999, then resets. If continuous framing errors are present, the counter will increment at rate of one per second, and a small box will appear above and to the right of the count. The BPV indicator has two states, BPV=YES and BPV=NO, which indicate the presence or absense of BPVs. Also on the display is the reminder message RESET=^, which reminds the operator that the A key will reset the framing-error counter to zero.

2. MEASURE CHANNEL Display Format

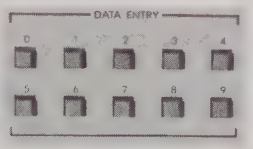
This display mode shows the results of measured parameters on a selected receive channel. Above the mode label is REC, indicating RECeive mode. The currently selected channel is displayed above the CH label. Above the FREQ label will be the frequency (in Hz) of any single-tone analog signal present on the selected channel. (The frequency count is updated once a second, indicated by a flashing box to the right of the measured frequency.) The amplitude (in dBm) of this tone will be displayed above the LEVEL label. To the right of the level indication is a display of any PCM offset present, in the format PCM OFFSET =xx, where xx equals the amount of offset. (The PCM offset measurement is explained in Section 4.5.1 [b], page 4-10.)

3.4 OPERATION KEYS



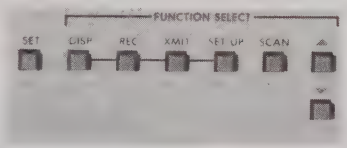
There are three groups of momentary-contact keyswitches (Keys) located directly below the alphanumeric display, which are used to set T308 testing parameters. In addition to the three groups is the SET key, which is used to place selected testing parameters in the T308 memory. (All parameters are lost when power is removed from the set.)

3.4.1 DATA ENTRY Keygroup



These ten data-entry keys are labelled 0 through 9; they are used to enter testing parameter options or for the entry of numeric data.

3.4.2 FUNCTION SELECT Keygroup



There are seven keys used to select the operating functions of the T308. Four of the seven keys are used to set the alphanumeric display mode -- DISP, REC, XMIT and SETUP:

a. DISP Key -- This key is used with the REC or XMIT key to set the alphanumeric display to PARAMETER VIEW mode. Pressing DISP REC will cause receive testing parameters to be displayed, while pressing DISP XMIT will cause transmit testing parameters to be displayed.

b. REC Key -- Used with the DISP or SETUP keys to specify receive functions.

c. XMIT Key -- Used with the DISP or SETUP keys to specify transmit functions.

d. SET UP Key -- Used with the REC or XMIT keys, this key places the alphanumeric display in the PARAMETER SPECIFY mode. When the key is initially pressed, the alphanumeric display prompts the user to press either the REC or XMIT key to specify receive or transmit testing parameters.

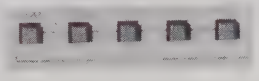
The other keys in the FUNCTION SELECT keygroup are SCAN, A▲ and B▼ . These switches are used to view the status of the signaling bits in a DS1 signal:

e. SCAN Key -- This key is used with the A▲ or B▼ keys to view the signaling bit status of all 24 channels of the DS1 signal. Pressing SCAN will cause the alphanumeric display to prompt the user to press the A▲ or B▼ key, which will select the display of A signaling bits or B signaling bits. Once the A▲ or B▼ key has been pressed, the alphanumeric display will show the status of the signaling bit for each channel.

f. A▲ Key -- Used with the SCAN key to select scanning and display of the B signaling bits. Also used with the MODIFY keygroup to increment the selected parameter.

g. B▼ Key -- Used with the SCAN key to select scanning and display of the B signaling bits. Also used with the MODIFY keygroup to decrement the selected parameter.

3.4.3 MODIFY Keygroup



Five keys are used to enter or modify the value of various testing parameters. They are used when the alphanumeric display is in the PARAMETER VIEW mode (selected by a FUNCTION SELECT key). The keys are CHAN, FREQ, LVL, ALM and A/B:

a. CHAN Key -- Used to specify or change a DS1 channel for transmit or receive. When the key is pressed, brackets will appear around the CH parameter on the alphanumeric display. The channel number (1-24) is then entered using the DATA ENTRY keygroup. The A▲ and B▼ keys can also be used to step up and down through the channels in RECeive mode only.

b. FREQ Key -- Used to specify or change the frequency of the VF generator (SYNthesizer) when it is used as the transmit source. When the key is pressed, brackets will appear around the FREQ parameter on the alphanumeric display; then th frequency is entered using the DATA ENTRY keygroup. The generator frequency can be stepped up or down in 100 Hz jumps using the A▲ or B▼ keys.

c. LVL Key -- Used to specify or change the amplitude level of the VF generator when it is used as the transmit source. When pressed, brackets will appear around the LEVEL parameter on the alphanumeric display. Then the LEVEL is entered using the DATA ENTRY keygroup. The level can be stepped up or down in 10 dB jumps using the A▲ and B▼ keys. Pressing the key twice will change the level from - to +.

d. ALM Key -- Used to send the DS1 alarm condition. (The alarm condition is defined as bit 2 of all timeslots being set low.) Pressing the key once will place brackets around the word OFF at the ALM parameter in the alphanumeric display. Pressing the key again will turn the alarm ON. Pressing the key multiple times will cycle the alarm ON and OFF.

e. A/B Key -- Used to change the A or B signaling-bit status when the transmit signaling source is INTernal. Pressing the key once will cause four dashes to be displayed in the FRAME parameter area of the alphanumeric display, indicating a change is in progress. In the SIGNALING parameter area, the current state of the A and B bits will be displayed. The A▲ and B▼ switches are then used to cycle the status of either the A or B bit, respectively.

3.4.4 The SET Key

Parameters are loaded into the T308 using the SET key. When the alphanumeric display is in the PARAMETER VIEW mode and one of the MODIFY keys is pressed, four dashes will appear in the FRAME parameter area; these dashes indicate a modification in progress and that the modification has not been completed. When the SET key is pressed, the dashes will disappear, indicating that the modification to the testing parameters has been successfully loaded. The set key is also used to exit from the receive SCAN mode.

3.5 T308 Jackfield

The T308 jackfield is shown in Figure 3-5; a brief description of the jackfield is given below.

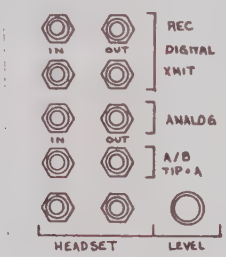


Figure 3-5 — The T308 jackfield

3.5.1 Digital Jacks

There are four jacks used to connect the T308 to the T1 system. The DIGITAL REC jacks are color-coded blue; one is the IN jack, which is connected to the T308 receive section, and the other is the OUT jack, connected in parallel with the IN jack. The DIGITAL XMIT IN and OUT jacks connect to the input and output of the T308 transmit section, respectively.

3.5.2 Analog Jacks

The are two jacks -- an ANALOG IN, color-coded red, and an ANALOG OUT, color-coded blue. Decoded analog signals from the receiver are available at the OUT jack (used to connect to a Transmission Measuring Set). Analog signals, which can be encoded onto a channel, are sent to the T308 transmit section through the IN jack.

3.5.3 A/B Jacks

The A/B IN and OUT jacks are used to send or receive the A and B signaling bits on a selected channel. In receive mode, the decoded signaling data is available at the OUT jack. When the signaling source of the transmit section is selected as external, the A/B source supplies signaling through the IN jack.

3.5.4 Headset Jacks

A standard telephone headset can be connected to the T308 through the HEADSET jacks. In receive mode, decoded analog signals will heard in the headset earpiece. When the headset is selected as the transmit source, the the analog headset signal will be encoded onto the DS1 signal. Loop current for proper operation of the headset transmitter is supplied by the T308.

3.6 T350 T1C MULTIPLEXER OPTION PANEL CONTROLS AND CONNECTIONS

3.6.1 Introduction

This section describes the function of each switch, indicator and jack on the Model T350. The description is broken down into subsections relating to POWER, MODE SELECTION, STATUS INDICATION and INPUT/OUTPUT CONNECTIONS. A T350 front-panel drawing is shown in Figure 3-6.

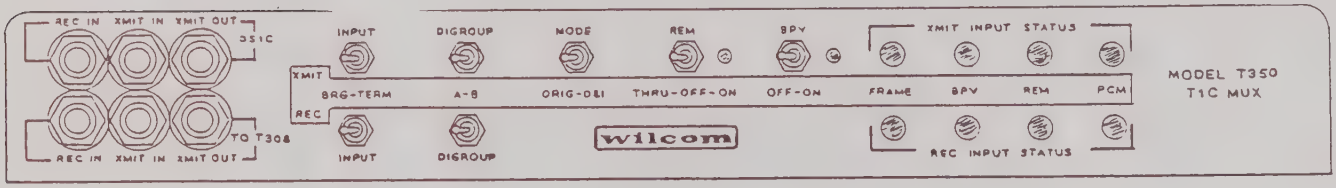


Figure 3-6 -- T350 Front Panel Layout

3.6.2 Power

There are no power connections or power switch on the Model T350 -- since it is designed to be mounted on the Model T308-01, the power switch on the T308 provides on-off control. Power wiring is integral to the T308-05.

3.6.3 Mode Selection

3.6.3.1 Receive/Transmit Controls

There are seven front-panel toggle switches on the Model T350; five are used to select transmit options, and two are used for receive options. The transmit switches are along the top of the panel, and are clearly marked as transmit functions by an XMIT label located to the left of the INPUT switches. Also in this area is the REC label to indicate the receive switches.

3.6.3.1.1 Transmit Controls

INPUT -- Used to select a BRidGing or TERMinating input condition. In the bridging mode, the input impedance is 1000 ohms, and in the terminating mode, the input impedance is 100 ohms. The BRIDGING position is intended for use on non-standard DSX panels (digital cross connects) which do not include intergral 430-ohm resistors in the monitor jack tip and ring contacts.

DIGROUP -- Selects the active DIGROUP (A or B). In the Drop & Insert mode, the selected channel from the T308 will be multiplexed into the selected DIGROUP; the other DIGROUP will be passed through without modification. If the Originate mode is selected, the T1 (DS1) signal from the T308 will replace the selected DIGROUP and the other DIGROUP sends an all "1s" pattern.

NOTE: Changing from one DIGROUP to the other while connected to a T-system may cause a hit or carrier switch.

MODE -- Allows selection of either the ORIGinate or Drop & Insert (D&I) modes. This switch setting MUST match the mode selection on the T308. In the ORIGINATE mode, all T1C (DS1C) signals and timing are generated in the T350; in D&I mode timing comes from the external DS1C signal and a channel in the selected DIGROUP is replaced by channel information from the T308.

REM -- Used to set the REMote alarm status. In the D&I and THRU settings, any alarm condition present on the incoming DS1C signal is passed through the T350 to the system under test. In the OFF position, the alarm is always off, and it is always ON when the ON position is selected. A red LED, located next to the REM switch, is illuminated when the switch is in the OFF or ON position to indicate the remote alarm status is being modified by the T350.

BPV -- Sets the BiPolar Violation generator ON or OFF. When in the ON position, bipolar violations, at a rate of three per second, are generated. An LED, located next to the BPV switch, is illuminated when the BPV switch is ON.

3.6.3.1.2 Receive Controls

INPUT -- Used to select a BRidGing TERMinating input condition for the receive section of the T350. In the bridging mode, the input impedance is 1000 ohms, and in the terminating mode, the impedance is 100 ohms (see paragraph 3.6.3.1.1).

DIGROUP -- Selects the active receive DIGROUP (A or B) to be demultiplexed and sent to the T308.

3.6.4 Status Indicators

3.6.4.1 Located to the right of the control switches is a group of eight LED indicators. The LEDs identify the status of four common parameters of the receive and transmit T1C signals -- Framing errors (FRAME), Bi-polar Violations (BPV), Remote Alarm (REM) and PCM error (PCM). Each indicator function is described in detail below.

FRAME -- Indicates a framing error in the DS1C signal when illuminated.

BPV -- Indicates a bipolar violation in the DS1C data stream when illuminated.

REM -- Indicates a Remote Alarm has been sent when illuminated.

PCM -- Indicates the incoming PCM DS1C signal level is inadequate for proper T350 operation when illuminated.

3.6.5 Input/Output Connections

3.6.5.1 Access to the T350 receive and transmit sections is provided by a jackfield containing six 310-type jacks. Figure 3-7 is a line drawing of the jackfield on the front panel. The jacks are in two sets of three -- one set is for interface with the T1C system, and the other set interfaces with the T308.

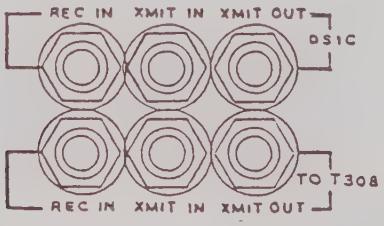


Figure 3-7 -- The T350 Jackfield

3.6.5.1.1 DS1C (T1C) Connections

The three jacks which connect the T350 to the T1C system are labelled REC IN, XMIT IN and XMIT OUT. A border with the label DS1C identifies the jacks as the T1C-side of the T350. Each jack is used for the following functions:

REC IN -- Connection to the input of the DS1C (T1C) receive demultiplexer.

XMIT IN -- Connection to the input of the DS1C (T1C) transmit demultiplexer.

XMIT OUT -- Connection to the output of the DS1C (T1C) transmit multiplexer.

3.6.5.1.2 T308 Connections

The three T308 connections as indicated by the border label, have the following functions:

REC IN -- Connection to the demultiplexed DS1 (T1) output of the receive demultiplexer. (This connects to the REC IN jack on the T308.)

XMIT IN -- Connection to the DS1 (T1) output of the transmit demultiplexer. (This connects to the XMIT In on the T308.)

XMIT OUT -- Connection to the DS1 (T1) input of the transmit multiplexer. (This connects to XMIT OUT on the T308.)

4.0 OPERATION

4.1 Introduction

This section describes the general operation of the T308 PCM Channel Access Set. Applications using the T308 and the T350 T1C Multiplexer option are given in the next section; please refer to that section for specific applications information on the sets. New users should read and understand this section before using the T308.

4.1.1 Overview

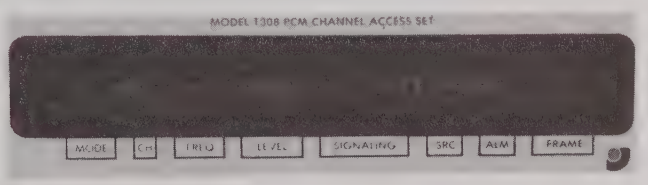
As discussed in the previous section, the T308 uses english-like displays for setup or operational changes. In the following paragraphs, examples are given on how to setup the T308 for initial operation and modification of the initial settings. Either Tansmit or Receive parameters must be set before the T308 is connected to the T1 system.

4.2 Initial T308 Configuration — Transmit Side

T308 transmit access parameters are set in the following order:

SEND SOURCE
TRANSMIT MODE
A/B SIGNALING SOURCE
CHANNEL NUMBERING CONVENTION
CODING SCHEME

In the following examples, the T308 is configured in the ORIGINATE mode, with the VF generator as the SEND SOURCE. Although specific options will be selected in these examples, other options are explained.



a. When the POWER switch is initially turned ON, the above message will be shown on the alphanumeric display. (The model and version number may be different than the above.) The XMIT option is selected by pressing the XMIT key in the FUNCTION SELECT keygroup, placing the display in the PARAMETER SETUP mode, as shown below (a different display will be shown if REC is selected -- see Section 4.2.2):

b. The first transmit parameter set up is the SEND source; this is the source of the analog signal to be encoded onto a selected DS1 channel. The options are:

1 - SYN
This option selects the internal sine-wave generator (SYNthesizer) as the analog source. The generator can produce a signal with a frequency range of 10 to 3990 Hz and an amplitude range of -60 to +2.9 dBm.

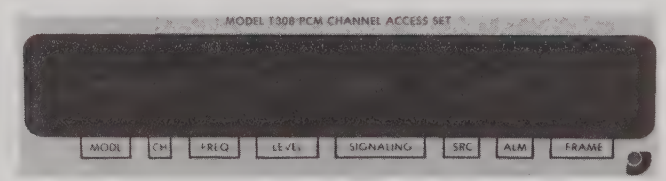
2 - QUIET
This option allows the operator to use a QUIET TERMINATION as the transmit source (all 1s code).

3 - INPUT
The INPUT option allows an external analog signal to be encoded onto the DS1 channel; the signal is supplied to the T308 through the ANALOG IN jack.

4 - HST
This option allows a standard HeadSeT to be encoded onto the selected DS1 channel; the headset is connected to the T308 through the HEADSET 310 jacks.

5 - THRU
THRU is used when no analog signal is encoded on the DS1 channel; it is used when initially connecting the T308 to a system when in DROP and INSERT mode.

In this example, the first option, SYN, is selected by pressing the 1 key in the DATA ENTRY keygroup. Once selected, the next display will appear:



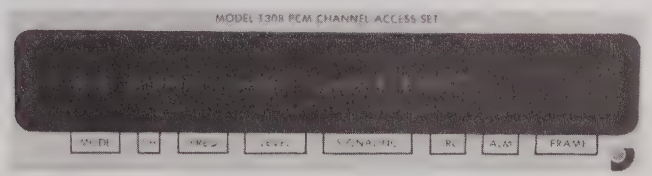
c. In this section, the transmit MODE is selected. There are three transmit modes, and the selection depends on the application:

1 - ORIG
This option selects ORIGinate mode, which is used in testing an OUT-OF-SERVICE system. In this mode, the T308 generates the entire DS1 signal, with timing based on an internal clock. All channels except the selected channel transmit a quiet (all 1s) code.

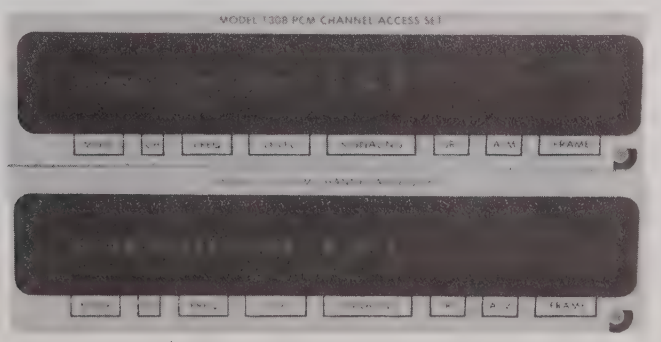
2 - D&I
Drop and Insert (D&I) mode is used for testing an IN-SERVICE system. In this mode, one channel of the 24 is dropped and the selected SEND SOURCE is encoded and inserted in place of the dropped channel. Timing is supplied by the source DS1 signal.

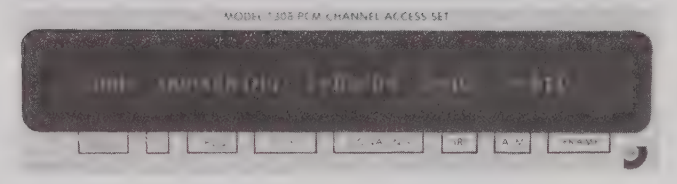
3 - LOOP
LOOP mode is a special version of the DROP and INSERT mode; timing is extracted from a DS1 signal applied to the REC IN jack, and channel data is generated by the T308. All channels except the selected channel transmit a quiet (all 1s) pattern. The XMIT OUT signal is then looped back to the originating equipment.

In this example, ORIGinate mode is selected by pressing the 1 key in the DATA ENTRY keygroup. Once the key is pressed, the next display will appear:



d. This display prompts the operator to select a source of A and B signaling bits. The two options allow the bit states to be set INTernally, or set by external equipment. When the EXTERNAL INPUT option is selected, A and B signaling for the selected channel is received through the front-panel A/B INPUT jack. If the INTernal option is selected, two additional displays will prompt the operator to enter the A and B bit states (see below). In the example, the INTernal option is selected, and the bit states are set as A=1 and B=1.

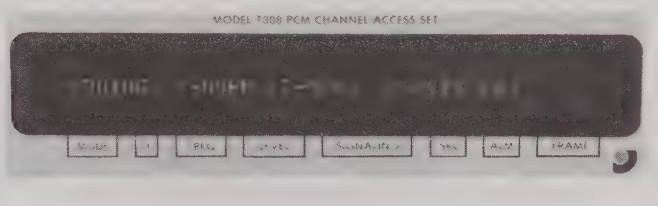




e. This display prompts the operator to select the channel numbering scheme used on the T1 system:

1 - D3/D4
2 - D2
3 - D1D

In the example, D3/D4 numbering is selected by pressing the 1 key in the DATA ENTRY keygroup. After this selection, the following is displayed:

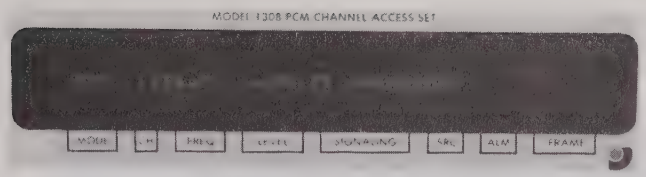


f. This display prompts the operator to enter the DS1 coding scheme used:

1 - NORM (7-5/6)
NORMal coding is the typical coding scheme; the eighth-bit on the sixth and twelveth frames carries signaling information (robbed-bit signaling).

2 - CCIS (8)
In CCIS (Common Channel Interoffice Signaling) coding, all eight bits are used to encode the analog signal. Used in situations where robbed-bit signaling is not required.

In this example, normal coding is selected by pressing the 1 key in the DATA ENTRY keygroup. Coding is the last transmit parameter entered, once this has been completed, the display will prompt the operator to enter receive parameters:



4.3 Initial T308 Configuration -- Receive Side

The display shown above will be displayed if the RECeive option is selected at power up or if the transmit parameters have been completely specified. As explained in section 4.3, when the alphanumeric display is in the PARAMETER SPECIFY mode, the operator will be prompted to select various options by pressing a number in the DATA ENTRY keygroup. The receive mode is selected using the options shown in the above display:

a. REC Mode

1 - TRACK

In this mode, the receive channel of the T308 will track the transmit side -- when the transmit channel is changed, the receive section will follow the transmit channel setting. The receive channel numbering and coding conventions are the same as the transmit side.

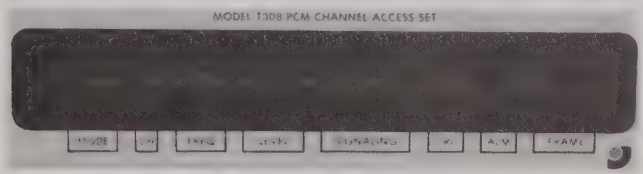
2 - SPLIT

SPLIT mode allows the receive channel to be selected independently of the transmit channel.

3 - MEASURE

The MEASURE option allows analog measurements to be made on a specific channel, or overall quality measurements to be made on the entire DS1 signal. This option can not be selected when the receive section is initially set up -- it is used only after TRACK or SPLIT has been selected.

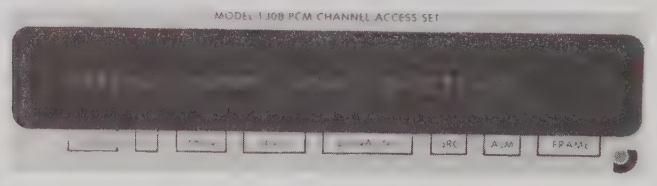
If the T308 is being set up for a receive-only application (such as monitoring a T-line), or the receiver is being set up for the first time, option 1 or 2 must be chosen. This ensures the receive-section channel numbering convention and coding scheme are correctly initialized. In this next example, the receiver is set up in the TRACK mode. First, TRACK mode is selected by pressing the 1 key in the DATA ENTRY keygroup. This results in the following display:



This display prompts the operator to select the channel numbering scheme for the receive section, which should match the T1 system to be measured:

1 - D3/D4
2 - D2
3 - D1D

In the example, D3/D4 numbering is selected by pressing the 1 key in the DATA ENTRY keygroup. After this selection, the following is displayed:



f. This display prompts the operator to enter the DS1 coding scheme for the receive section:

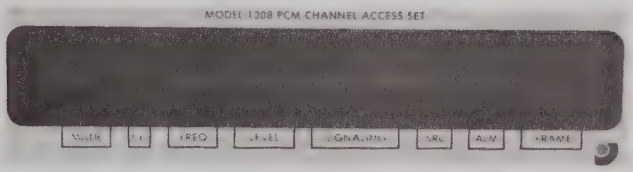
1 - NORM (7-5/6)
NORMal coding is the typical coding scheme; the eighth-bit on the sixth and twelveth frames carries signaling information (robbed-bit signaling).

2 - CCIS (8)
In CCIS (Common Channel Interoffice Signaling) coding, all eight bits are used to encode the analog signal. Used in situations where robbed-bit signaling is not required.

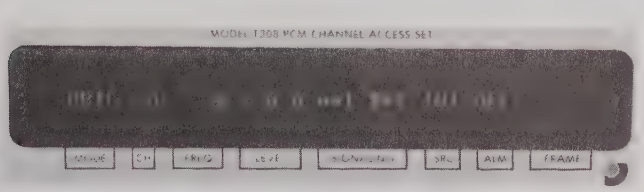
A normal coding scheme is selected by pressing the 1 key.

The receive parameters specified above are not required to be set if transmit-section parameters are set, because the specified transmit parameters are used for the receive section. The message shown below is displayed when all parameters, Transmit/Receive or receive, have been specified. When the SET key is pressed, these parameters are entered into the T308 memory, and will remain set until changed using the FUNCTION SELECT keygroup or when power is removed. Also, the alphanumeric display will change to the PARAMETER VIEW mode, either with transmit or receive parameters being displayed, depending on which parameters were specified last.

Example of receive parameters:



If both receive and transmit parameters are set, the transmit parameters will be displayed (Example):



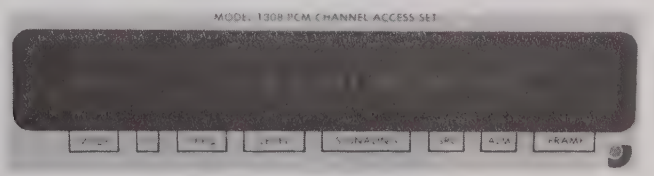
4.4 Modifying T308 Access Parameters

4.4.1 Introduction

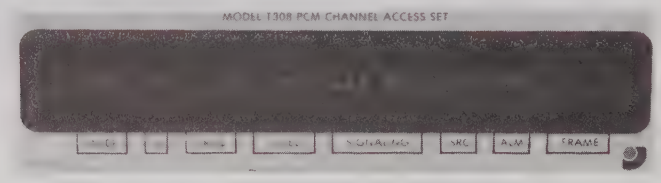
Once the initial operating parameters have been specified, they may be modified using the FUNCTION SELECT keys. Initial setup parameters can be modified using the SET UP and XMIT or REC keys, while operational parameters (such as channel, frequency, amplitude or signaling) are modified using the DISP and XMIT or REC keys.

4.4.2 Selecting/Modifying a Channel Number

To select or modify a channel, the alphanumeric display must be in the PARAMETER VIEW mode. This is accomplished by pressing the DISP key followed by the XMIT key to view/change transmit parameters, or the REC key to view/change receive parameters. Pressing the CHAN key then places brackets around the current channel number, as shown below:



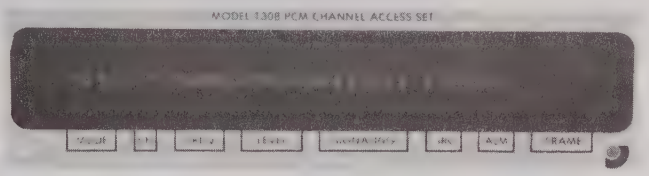
When the brackets are around the channel number, the new number is entered using the DATA ENTRY keys. Valid channels are 1 through 24. If a transmit channel is being entered, four dashed lines will appear above the FRAME label -- these indicate the change has not been entered into the T308. Pressing the SET key will then change the channel number and store the new number internally. The dashed lines will disappear, indicating the change is complete. When specifying more than one parameter, the SET key need not pressed until all parameters are specified. In RECEIVE MODE ONLY, the DATA ENTRY keys can be used to enter the channel number directly, or the A▲ and B▼ keys can be used to sweep up and down through the channels. New channels are valid as soon as the channel number has been completely entered (in the case of channels 10 through 24), when the SET key is pressed, or when the A▲ or B▼ key is pressed. The display below shows a channel being selected for the transmit sction:



4.4.3 Specifying/Modifying VF Generator Parameters

If the VF generator (SYNthesizer) is selected as the analog SEND source, the frequency and amplitude of the generator must be specified initially, or can be modified at any time. Pressing the DISP and XMIT keys will display the current settings for the generator. To change frequency, the FREQ key is pressed. This will place brackets around the FREQ parameter (see below). The new frequency, from 10 to 3990 Hz, is then entered using the DATA ENTRY keys. The lowest frequency available is 10 Hz, therefore the least-significant zero is always displayed. This means a frequency of 1000 Hz would be entered by pressing 100. Another way to change frequency is by pressing the A▲ or B▼ keys. This will increase or decrease the frequency in 100 Hz steps, respectively. To complete entry of the frequency, the SET key is pressed, or the LVL key can be pressed, to set the amplitude before pressing the SET key.

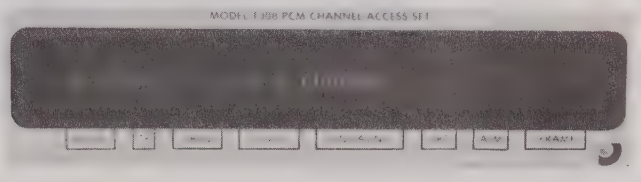
To set the level of the generator, the LVL key is pressed. (The display must be in the PARAMETER VIEW mode, set by pressing DISP and XMIT, if not already done.) This places brackets around the LEVEL parameter (see below). The level, in the range of -60.0 to +2.3 dBm, is entered using the DATA ENTRY keys, or the A▲ and B▼ keys can be used to increase or decrease the level in +10 or -10 dB steps, respectively. (The level can be set to +dBm values from -dBm values by pressing the LVL key twice.) Once the level is set, the SET key is pressed to enter the new value into the T308.



4.5 Selecting LINE/CHANNEL Receive Options

4.5.1 Measuring LINE/CHANNEL Characteristics in Receive Mode

As explained in Section 3.3.1, there are two receive measurement options -- LINE MEASUREMENT and CHANNEL MEASUREMENT; these receive options are selected by pressing the SET UP and REC keys.



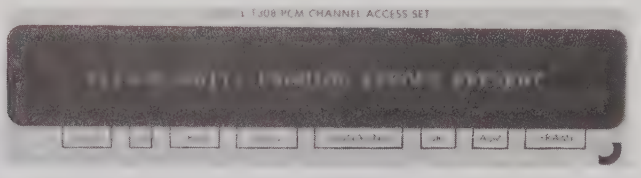
a. LINE MEASUREMENT

Pressing the 1 key allows the measurement of framing errors, and provides an indication of Bipolar Violations present on the DS1 signal. Once the option has been selected, the display will be as shown below. The T1 signal connects to the T308 DIGITAL RECEIVE IN jack and (typically) to the MONITOR jack on the Digital Switch or Channel Bank.

b. CHANNEL MEASUREMENT

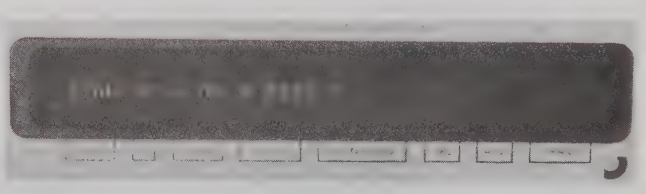
Pressing the 2 key will allow the analog measurement of a selected channel, as well as the monitoring of receive or transmit framing errors and bipolar violations. Once the option is selected, the display will be similar to that shown below:

The frequency and amplitude of the signal present on the selected channel will be shown (valid readings for single tones only). Also, any PCM offset will be indicated. The PCM offset measurement detects any DC offset generated by the Channel Bank and displays this error as positive or negative offset in the range of -127 to +127 quantizing steps. There are no specific guidelines for PCM offset error; if routine records of system PCM offset are kept, they can be used as a reference to gauge any major change in system performance. (The analog measurements are independent of any PCM offset.) If there are framing errors present during the measurement, the following message is displayed:

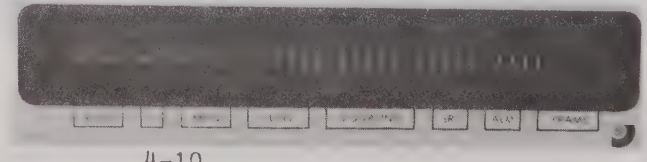


4.5.2 Monitoring Signaling-bit Data

Once the T308 has been set up and is connected to the T-carrier system, the signaling-bit status of all 24 channels can be scanned and displayed. Anytime receive parameters or receive measurements are being displayed, the SCAN key is pressed; this will result in the following display:



The A or B bits can then be displayed by pressing the A▲ or B▼ key. A typical scan is shown below:



The scan rate allows each channel to be sampled for a period of 10 mS; the monitor speaker is live during this period, and any analog signal present on a channel will be heard as the T308 scans the channel.

5.0 APPLICATIONS

The following section shows specific applications for the T308 and T308/T350 combination. Use the list below as a quick reference to each application:

Section	Description	Page
5.1	QUICK SET UP	5-2
5.1.1	Receive Mode	5-2
5.1.2	Measure Bit Stream	5-2
5.1.3	Measure Analog Parameters	5-3
5.2	OUT-OF-SERVICE TESTING	5-4
5.2.1	Simulate Incoming Trunks -- T1	5-4
5.2.2	Simulate Incoming Trunks -- T1C	5-6
5.2.3	Simulate Outgoing Trunks -- T1	5-8
5.2.4	Simulate Outgoing Trunks -- T1C	5-10
5.2.5	Send to Near End/Receive from Near End -- T1	5-12
5.2.6	Send to Near End/Receive from Near End -- T1C	5-14
5.2.7	Send to Near End/Receive from Far End -- T1	5-16
5.2.8	Send to Near End/Receive from Far End -- T1C	5-18
5.2.9	Receive from Near End/Send to Near End Loop test -- T1	5-20
5.2.10	Receive from Far End/Send to Far End Loop test -- T1	5-22
5.3	IN-SERVICE TESTING	5-24
5.3.1	Monitor Near End/Outgoing Trunks -- T1	5-24
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5.3.3	Bidirectional Line Monitor Test -- T1C	5-28
5.3.4	Send to Far End/Monitor and Receive Far End -- T1	5-30
5.3.6	Send to Far End/Monitor and Receive Far End -- T1C	5-32
5.3.7	Send to Near End/Monitor and Receive Near End -- T1	5-34
5.3.8	Send to Near End/Monitor and Receive Near End -- T1C	5-36

5.1 QUICK SET UP PROCEDURES

5.1.1 Initial Receive Mode

Press the following key sequence to set up the receiver:

SET UP	**REC**	**2**	**1**	**1**	**SET**
<Parameter Specify Mode>	<RECeive side>	<Split Mode>	<D3/D4 Conv.>	<Normal coding>	<Store>

The alphanumeric display should show the following once the above sequence is performed:

5.1.2 Measure Full DS1 Bit Stream

To measure a DS1 bit stream, preform the the sequence in 5.1.1 if not already done, followed by:

SET UP	**REC**	**3**	**1**
<Parameter Specify Mode>	<Receive side>	<MEASURE option>	<LINE option>

The alphanumeric display should show the following after completing the above sequence:

5.1.3 Measuring Analog Parameters on a Specific Channel

Perform the sequence in 5.1.1 if not already done, followed by:

SET UP	**REC**	3	2
<Parameter Specify Mode>	<Receive Side>	<Measure option>	<Channel option>

The alphanumeric display will then show the analog measurements for the current channel. To change to a different channel, preform this sequence:

DISP	**REC**	**CHAN**	**10**	**SET**
<Parameter Display Mode>	<Receive Side>	<Channel Parameter>	<Channel 10 selected>	<Store>

The above sequence selects channel 10 -- any other channel may be selected. The sequece selecting the MEASURE CHANNEL mode must be performed again to show the analog measurements for the new channel.

5.2 OUT-OF-SERVICE TESTING

5.2.1 Simulate Incoming Trunks Test -- T1 (T308)

a. Purpose

To evaluate the performance of channel banks or digital switches prior to the turn-up of T-carrier facilities or prior to direct termination of T1 systems at the digital switch.

b. Initial Setup

The T308 should be configured with the following parameter settings ("*" means operator selected):

SEND: **SYN**	XMIT MODE: **ORIG**	A/B SOURCE: **INT**
A BIT STATE: *	B BIT STATE: *	CHAN. NUMBERING: **D3/D4**
CODING: **NORM**	REC: **TRACK**	CH: *

Ensure the alphanumeric display shows the following before connecting to the T-carrier system:

```
ORIG  x    0    0.0  A=x B=x  INT  OFF
MODE CH FREQ LEVEL SIGNALING SRC ALM FRAME
```

If unfamiliar with the setup procedure for the above parameters, refer to section 4.2, page 4-1.

c. Connecting to the T1 System

Figure 5-1, on the opposite page, shows the connctions between the T308 and the T1 system. Note that a 100-ohm termination plug should be plugged into the PCM OUT jack toward the Span Terminating Equipment; this prevents any possibility of excessive crosstalk generated by an unterminated line.

d. Additional Testing Information

External analog signals and signaling can be applied to the T308 ANALOG IN and A/B IN jacks if the SEND source is changed to INPUT. Also, signaling information can be supplied by an external set by changing the signaling source to EXTernal.

SIMULATE INCOMING TRUNKS -- T1
(ORIGINATE MODE)
OUT-OF-SERVICE TEST -- SYSTEM TURNED DOWN

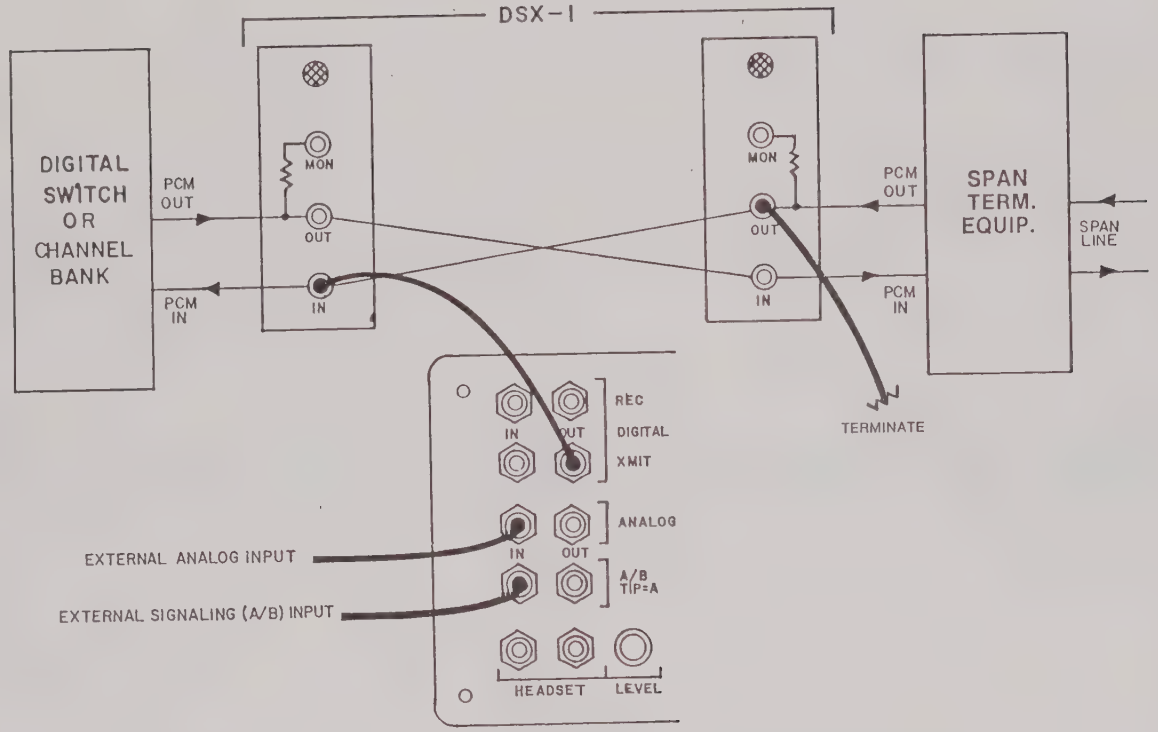


Figure 5-1

5.2.2 Simulate Incoming Trunks Test -- T1C (T308/T350)

NOTE: THIS TEST REQUIRES A T308 EQUIPPED WITH A T350 T1C MULTIPLEXER (T308-05)

a. T308 Setup

Read and perform the steps outlined in Section 5.2.1 [a] and [b]. Ensure the T308 alphanumeric display shows the correct information.

b. T350 Configuration

Place the T350 switches in the following positions:

XMIT INPUT: **TERM**	XMIT DIGROUP: *
REC INPUT: **TERM**	REC DIGROUP: *
MODE: **ORIG** REM: **OFF**	BPV: **OFF**

c. Connecting to the T1C System

Figure 5-2, below, shows the connections between the T308/T350 and the T1C system. Note that a 100-ohm termination plug should be plugged into the PCM OUT jack at the Span Terminating Equipment; this prevents any possibility of excessive crosstalk generated by an unterminated line.

SIMULATE INCOMING TRUNKS -- T1C
(ORIGINATE MODE)
OUT-OF-SERVICE TEST -- SYSTEM TURNED DOWN

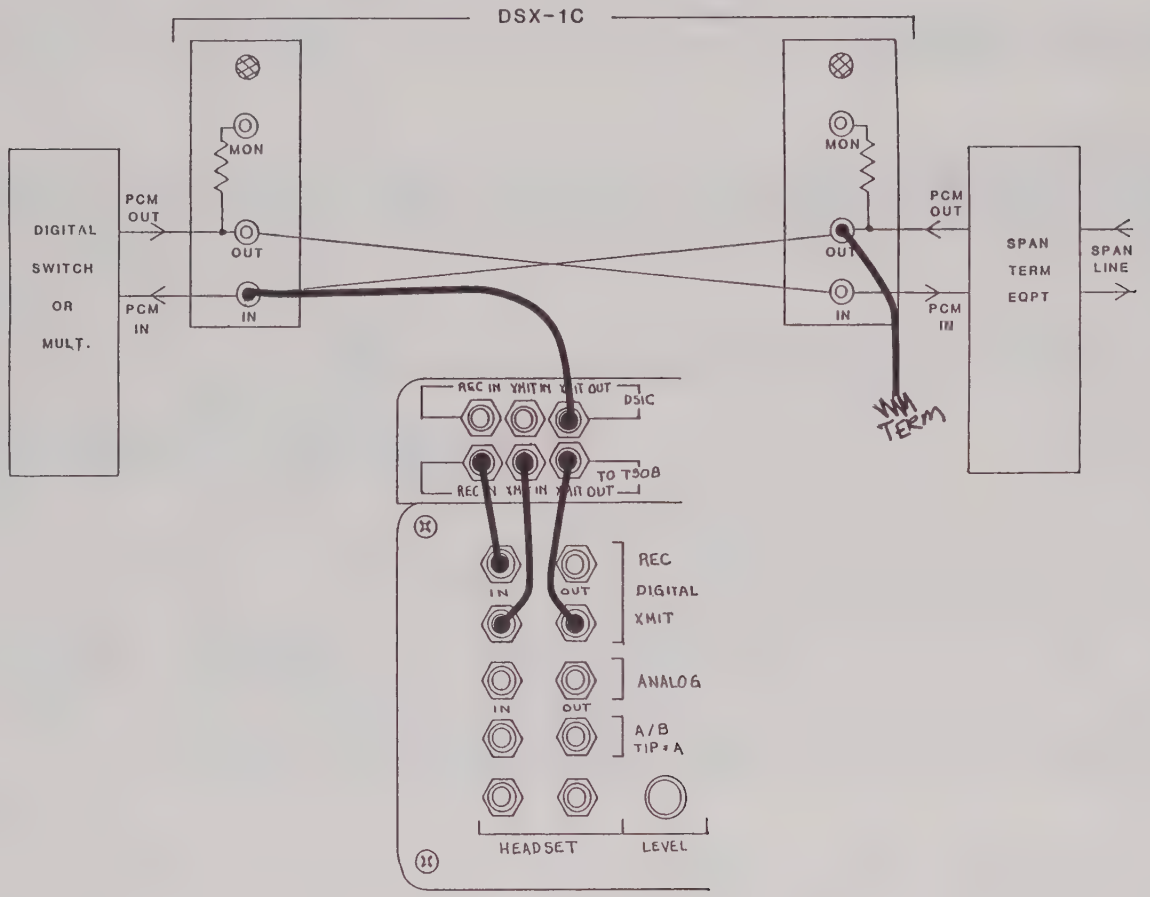


Figure 5-2

5.2.3 Simulate Outgoing Trunks Test — T1 (T308)

a. Purpose

1. To evaluate transmission, noise and signaling performance from near end to far end.

2. To evaluate performance of near-end-office repeaters, the T-span line and the far-end channel bank or digital switch

b. Initial Setup

The T308 should be configured with the following parameter settings ("*" means operator selected):

SEND: **SYN**	XMIT MODE: **ORIG**	A/B SOURCE: **INT**
A BIT STATE: *	B BIT STATE: *	CHAN. NUMBERING: **D3/D4**
CODING: **NORM**	REC: **TRACK**	CH: *

Ensure the alphanumeric display shows the following before connecting to the T-carrier system:

```
ORIG  x    0    0.0 A=x B=x  INT  OFF
MODE CH FREQ LEVEL SIGNALING SRC ALM FRAME
```

If unfamiliar with the setup procedure for the above parameters, refer to section 4.2, page 4-1.

c. Connecting to the T1 System

Figure 5-3, below, shows the connctions between the T308 and the T1 system. Note that a 100-ohm termination plug should be plugged into the PCM OUT jack toward the Digital Switch or Channel Bank; this prevents any possibility of excessive crosstalk generated by an unterminated span.

d. Additional Testing Information

External analog signals and signaling can be applied to the T308 ANALOG IN and A/B IN jacks if the SEND source is changed to INPUT. Also, signaling information can be supplied by an external set by changing the signaling source to EXTernal.

SIMULATE OUTGOING TRUNKS -- T1
(ORIGINATE MODE)
OUT-OF-SERVICE TEST -- SYSTEM TURNED DOWN

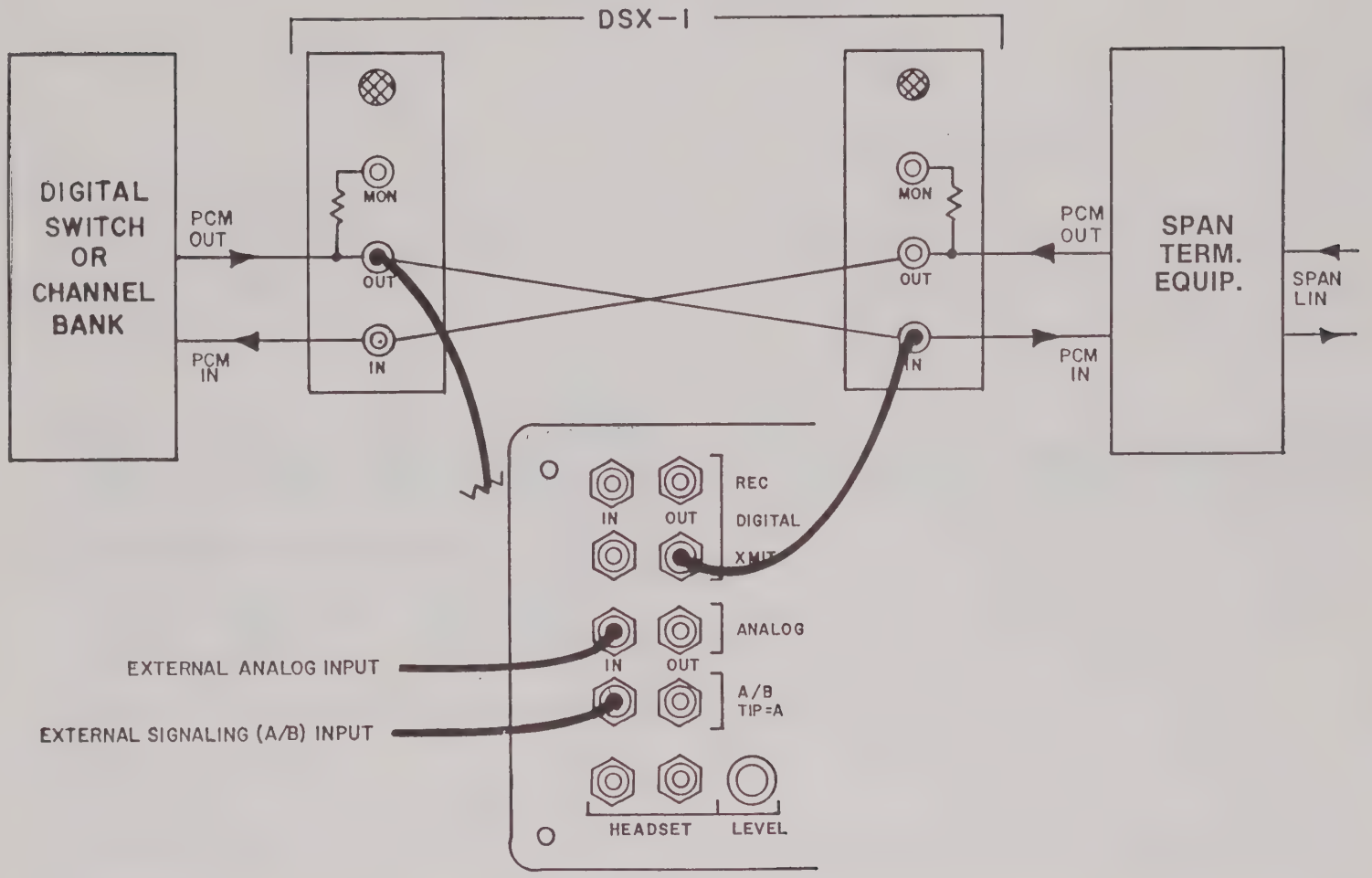


Figure 5-3

5.2.4 Simulate Outgoing Trunks Test -- T1C (T308/T350)

NOTE: THIS TEST REQUIRES A T308 EQUIPPED WITH A T350 T1C MULTIPLEXER (T308-05)

a. T308 Setup

Read and perform the steps outlined in Section 5.2.3 [a] and [b]. Ensure the T308 alphanumeric display shows the correct information.

b. T350 Configuration

Place the T350 switches in the following positions:

XMIT INPUT: **TERM**	XMIT DIGROUP: *
REC INPUT: **TERM**	REC DIGROUP: *
MODE: **ORIG** REM: **OFF**	BPV: **OFF**

c. Connecting to the T1C System

Figure 5-4, below, shows the connections between the T308/T350 and the T1C system. Note that a 100-ohm termination plug should be plugged into the PCM OUT jack toward the Multiplexer or Digital Switch; this prevents any possibility of excessive crosstalk generated by an unterminated line.

SIMULATE OUTGOING TRUNKS -- T1C
(ORIGINATE MODE)
OUT-OF-SERVICE TEST -- SYSTEM TURNED DOWN

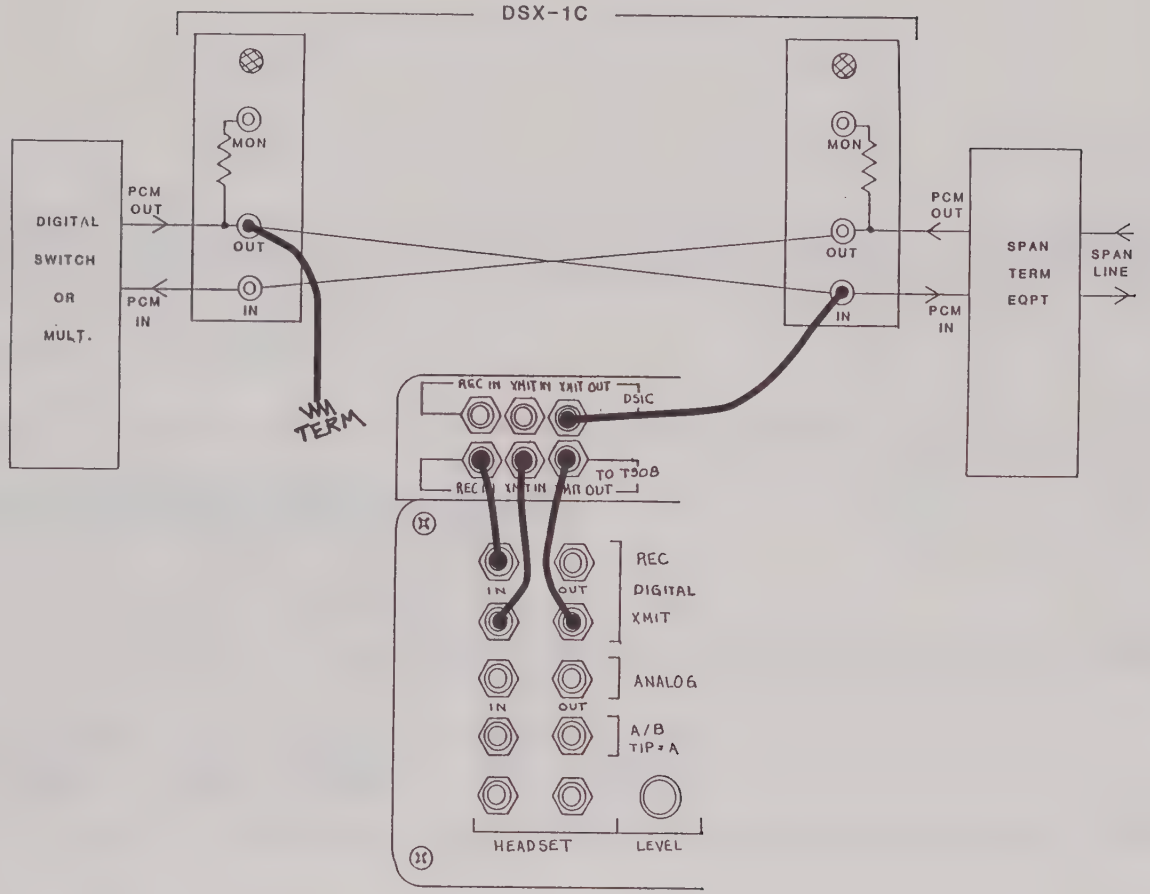


Figure 5-4

5.2.5 Send to Near End/Receive from Near End Test (T308)

a. Purpose

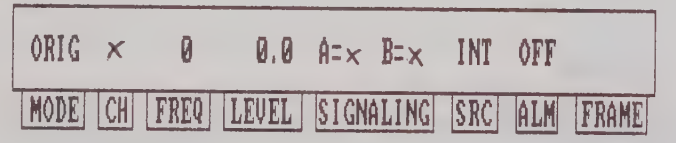
To verify VF and signaling operation on a particular channel.

b. Initial Setup

The T308 should be configured with the following parameter settings ("*" means operator selected):

SEND: **SYN**	XMIT MODE: **ORIG**	A/B SOURCE: **INT**
A BIT STATE: *	B BIT STATE: *	CHAN. NUMBERING: **D3/D4**
CODING: **NORM**	REC: **TRACK**	CH: *

Ensure the alphanumeric display shows the following before connecting to the T-carrier system:



If unfamiliar with the setup procedure for the above parameters, refer to section 4.2, page 4-1.

c. Connecting to the T1 System

Figure 5-5, below, shows the connections between the T308 and the T1 system. Note that a 100-ohm termination plug should be plugged into the PCM OUT jack toward the Span Terminating Equipment; this prevents any possibility of excessive crosstalk generated by an unterminated line.

SEND TO NEAR END/RECEIVE FROM NEAR END -- T1
(ORIGINATE MODE)
OUT-OF-SERVICE TEST -- SYSTEM TURNED DOWN

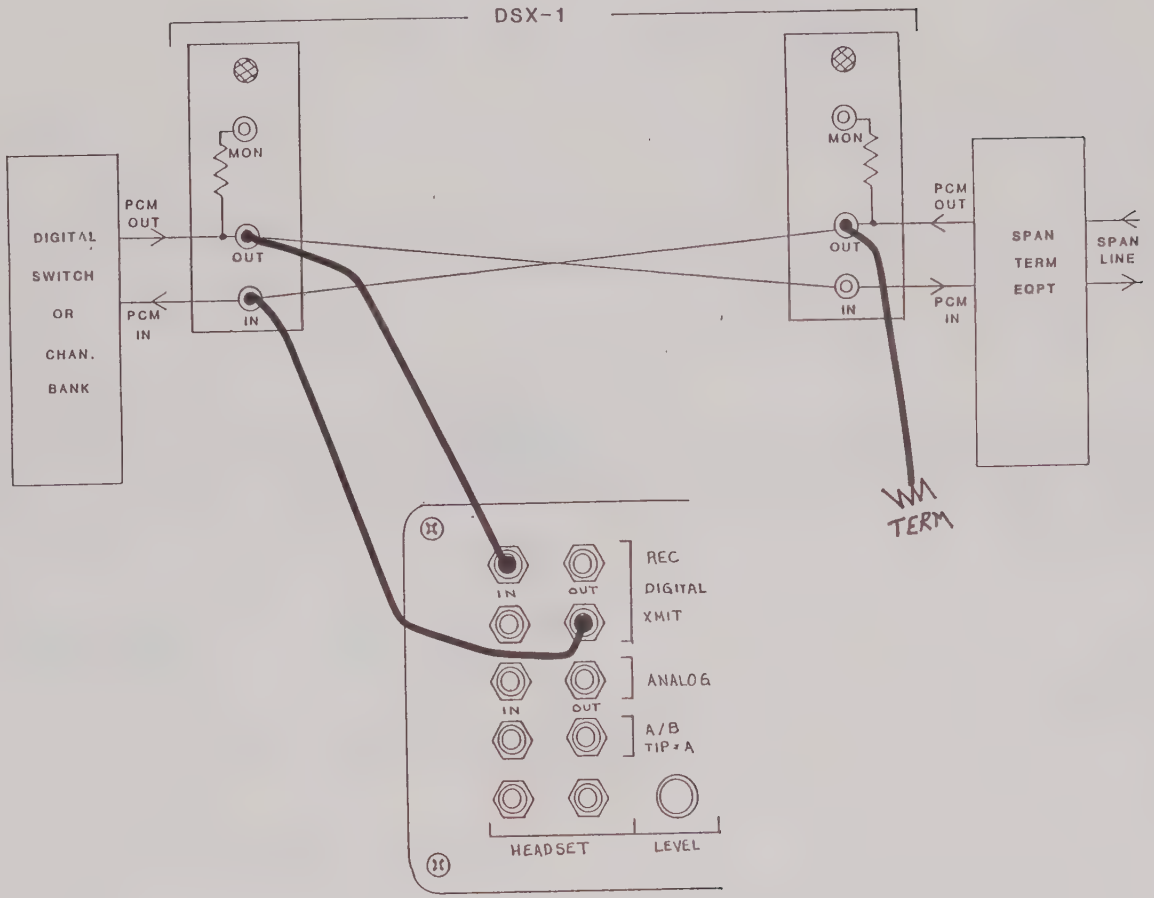


Figure 5-5

5.2.6 Send to Near End/Receive from Near End Test -- T1C (T308/T350)

NOTE: THIS TEST REQUIRES A T308 EQUIPPED WITH A T350 T1C MULTIPLEXER (T308-05)

a. T308 Setup

Read and perform the steps outlined in Section 5.2.5 [a] and [b]. Ensure the T308 alphanumeric display shows the correct information.

b. T350 Configuration

Place the T350 switches in the following positions:

XMIT INPUT: **TERM**	XMIT DIGROUP: *
REC INPUT: **TERM**	REC DIGROUP: *
MODE: **ORIG** REM: **OFF**	BPV: **OFF**

c. Connecting to the T1C System

Figure 5-6, below, shows the connections between the T308/T350 and the T1C system. Note that a 100-ohm termination plugs should be plugged into the PCM IN and OUTjackstoward the Span Terminating Equipment; this prevents any possibility of excessive crosstalk generated by an unterminated line.

SEND TO NEAR END/RECEIVE FROM NEAR END -- T1C
(ORIGINATE MODE)
OUT-OF-SERVICE TEST — SYSTEM TURNED DOWN

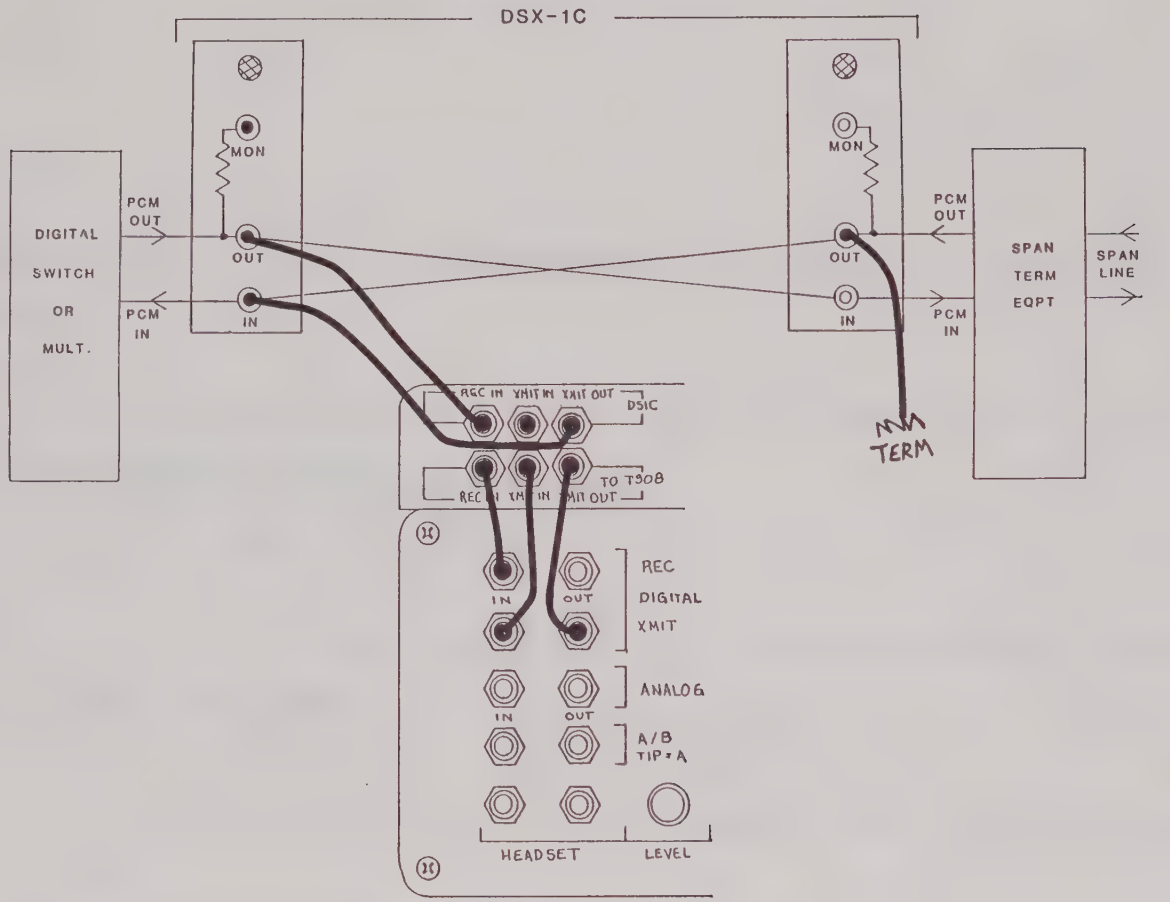


Figure 5-6

5.2.7 Send to Near End/Receive from Far End -- T1 (T308)

a. Purpose

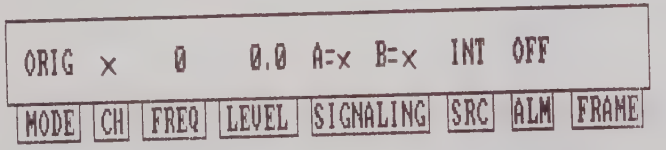
To verify VF and signaling operation on a particular channel.

b. Initial Setup

The T308 should be configured with the following parameter settings ("*" means operator selected):

SEND: **SYN**	XMIT MODE: **ORIG**	A/B SOURCE: **INT**
A BIT STATE: *	B BIT STATE: *	CHAN. NUMBERING: D3/D4
CODING: **NORM**	REC: **TRACK**	CH: *

Ensure the alphanumeric display shows the following before connecting to the T-carrier system:



If unfamiliar with the setup procedure for the above parameters, refer to section 4.2, page 4-1.

c. Connecting to the T1 System

Figure 5-7, below, shows the connections between the T308 and the T1 system.

SEND TO NEAR END/RECEIVE FROM FAR END -- T1
(ORIGINATE MODE)
OUT-OF-SERVICE TEST — SYSTEM TURNED DOWN

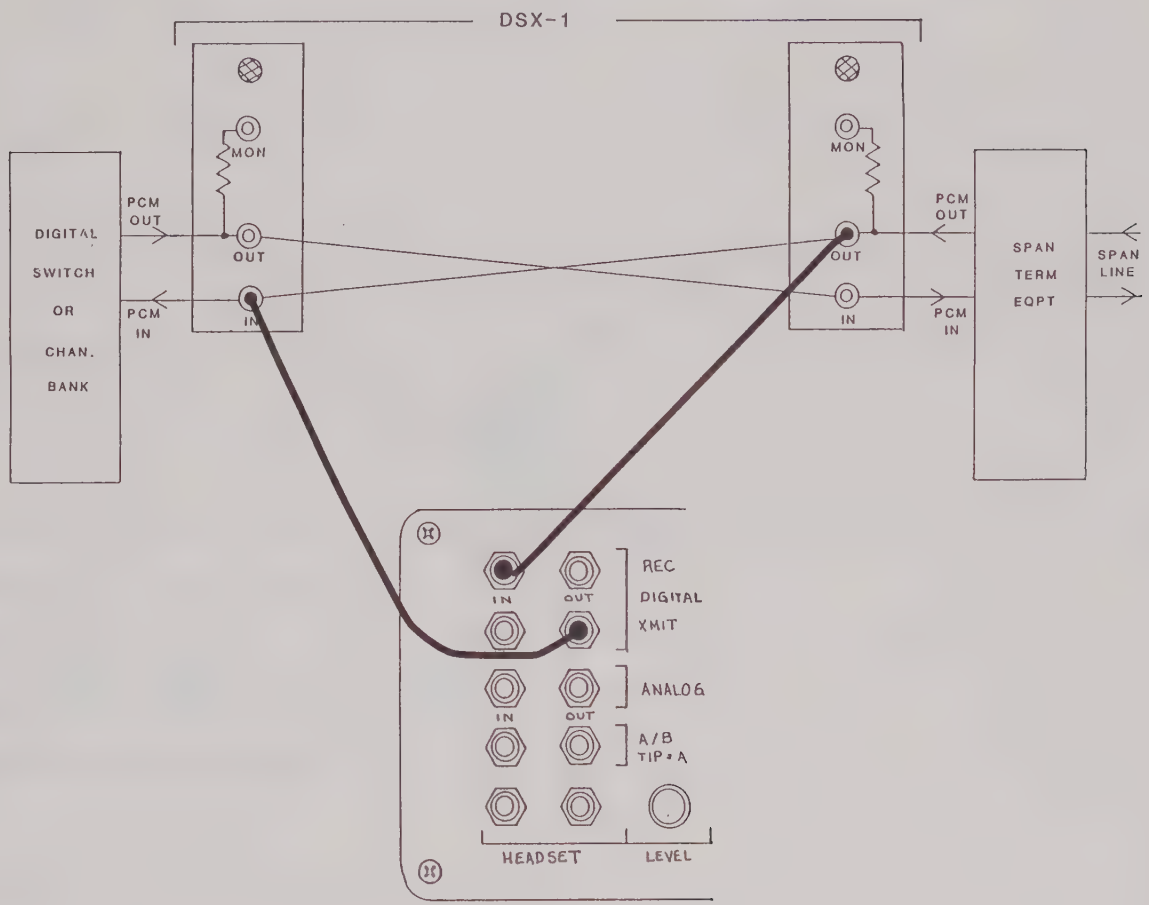


Figure 5-7

5.2.8 Send to Near End/Receive from Far End -- T1C (T308/T350)

NOTE: THIS TEST REQUIRES A T308 EQUIPPED WITH A T350 T1C MULTIPLEXER (T308-05)

a. T308 Setup

Read and perform the steps outlined in Section 5.2.7 [a] and [b]. Ensure the T308 alphanumeric display shows the correct information.

b. T350 Configuration

Place the T350 switches in the following positions:

XMIT INPUT: **TERM**	XMIT DIGROUP: *
REC INPUT: **TERM**	REC DIGROUP: *
MODE: **ORIG** REM: **OFF**	BPV: **OFF**

c. Connecting to the T1C system

Figure 5-8, below, shows the connections between the T308/T350 and the T1C system.

SEND TO NEAR END/RECEIVE FROM FAR END -- T1C
(ORIGINATE MODE)
OUT-OF-SERVICE TEST -- SYSTEM TURNED DOWN

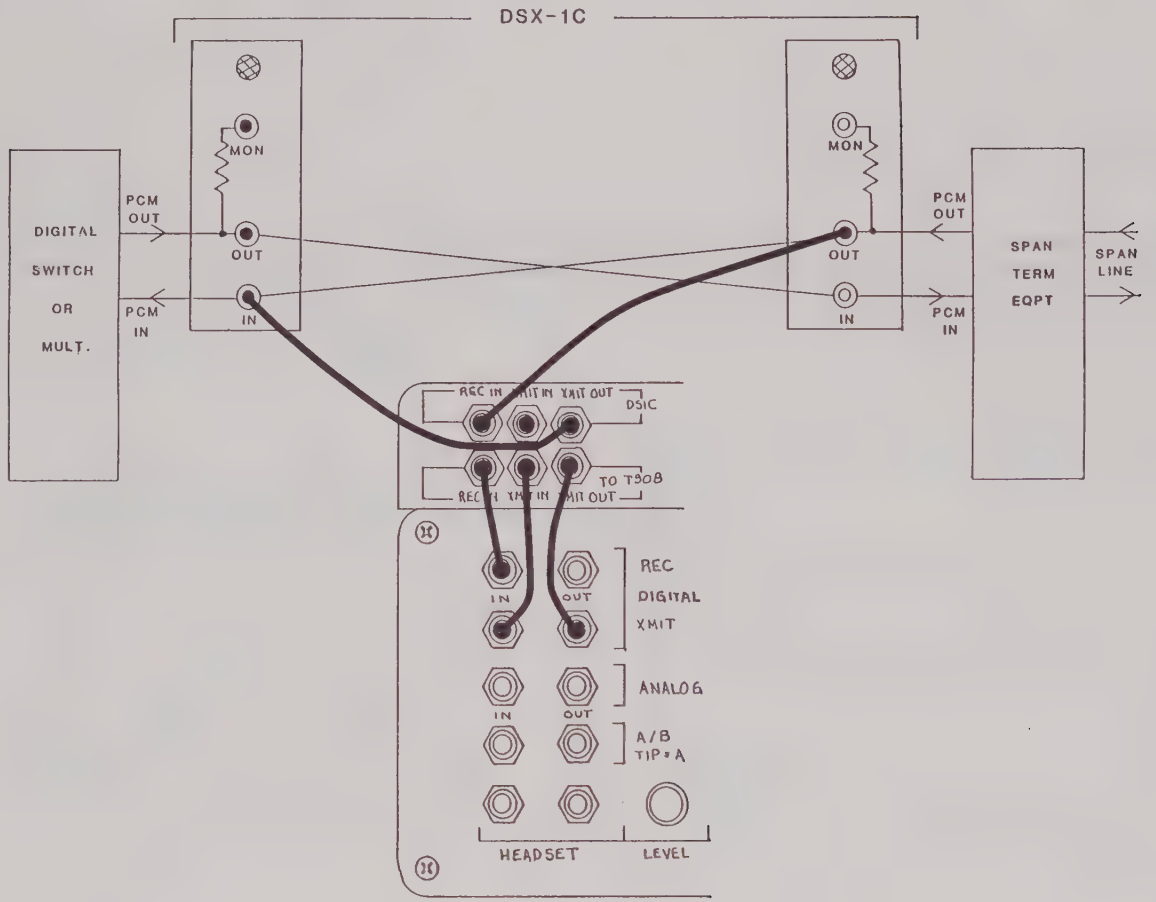


Figure 5-8

5.2.9 Receive from Near End/Send to Near End Loop Test -- T1 (T308)

a. Purpose

To verify proper operation of a Digital Switch or Channel Bank.

b. Initial Setup

The T308 should be configured with the following parameter settings ("*" means operator selected):

SEND: **SYN**	XMIT MODE: **LOOP**	A/B SOURCE: **INT**
A BIT STATE: *	B BIT STATE: *	CHAN. NUMBERING: **D3/D4**
CODING: **NORM**	REC: **TRACK**	CH: *

Ensure the alphanumeric display shows the following before connection to the T-carrier system:

```
LOOP  x    0    - 0.0   A=x  B=x  INT   OFF    R T
MODE  CH  FREQ  LEVEL  SIGNALING  SRC  ALM  FRAME
```

If unfamiliar with the setup procedure for the above parameters, refer to section 4.2, page 4-1.

c. Connecting to the T1 system

Figure 5-9, below, shows the connections between the T308 and the T1 system. Note that 100-ohm termination plugs should be plugged into the PCM IN and OUT jacks at the Span Terminating Equipment; this prevents any possibility of excessive crosstalk generated by an unterminated line.

RECEIVE FROM NEAR END/SEND TO NEAR END LOOP TEST -- T1
(LOOP MODE)
OUT-OF-SERVICE TEST -- SYSTEM TURNED DOWN

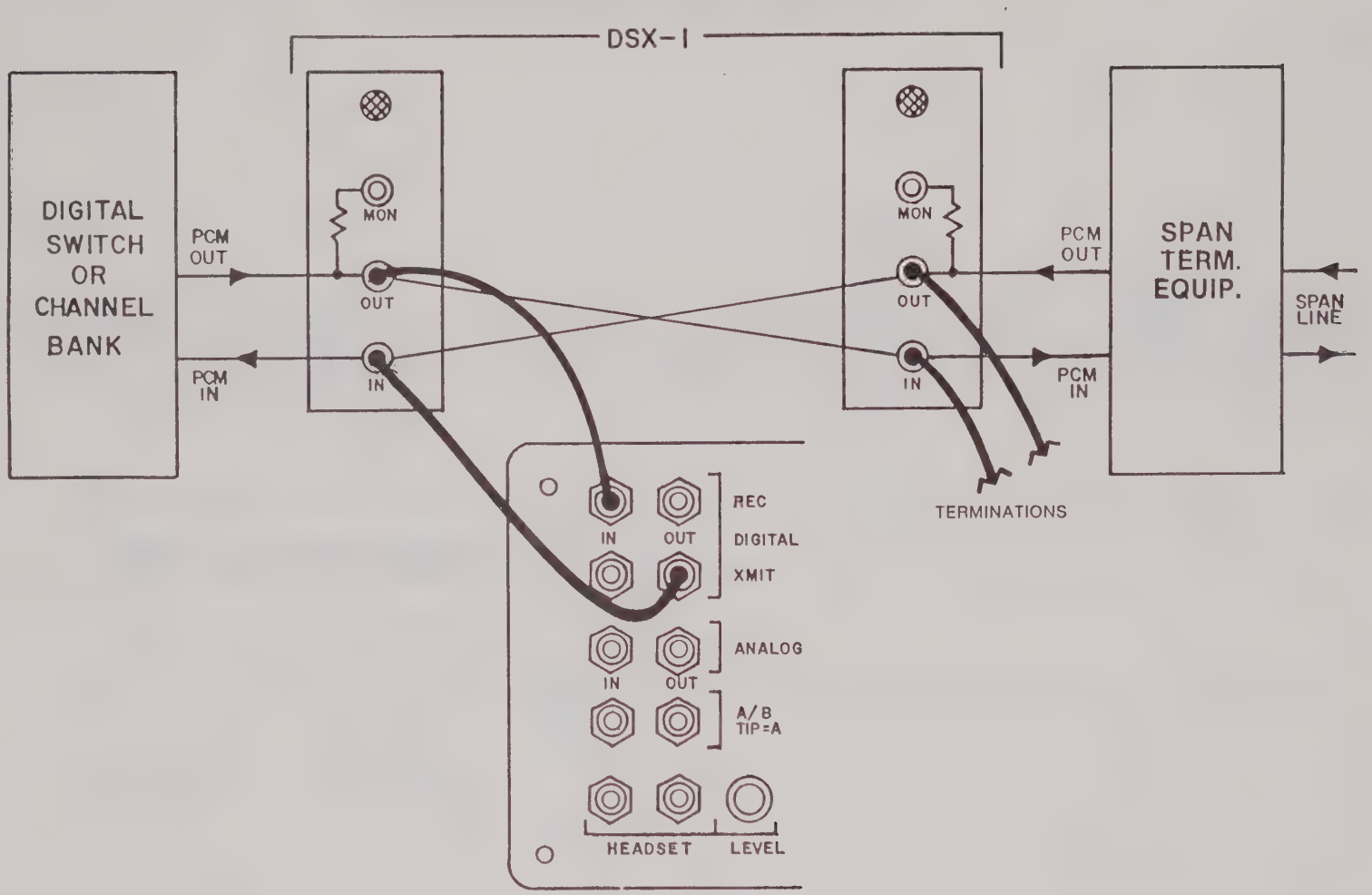


Figure 5-9

5.2.10 Receive from Far End/Send to Far End Loop Test — T1 (T308)

a. Purpose

To verify proper system operation from the far end.

b. Initial Setup

The T308 should be configured with the following parameter settings ("*" means operator selected):

SEND: **SYN**	XMIT MODE: **LOOP**	A/B SOURCE: **INT**
A BIT STATE: *	B BIT STATE: *	CHAN. NUMBERING: **D3/D4**
CODING: **NORM**	REC: **TRACK**	CH: *

Ensure the alphanumeric display shows the following before connection to the T-carrier system:

```
LOOP x   0   - 0.0  A=x B=x INT  OFF   R T
MODE CH FREQ LEVEL SIGNALING SRC ALM FRAME
```

If unfamiliar with the setup procedure for the above parameters, refer to section 4.2, page 4-1.

c. Connecting to the T1 system

Figure 5-10, below, shows the connections between the T308 and the T1 system. Note that 100-ohm termination plugs should be plugged into the PCM IN and OUT jacks at the Digital Switch or Channel Bank; this prevents any possibility of excessive crosstalk generated by an unterminated line.

RECEIVE FROM FAR END/SEND TO FAR END LOOP TEST -- T1
(LOOP MODE)
OUT-OF-SERVICE TEST — SYSTEM TURNED DOWN

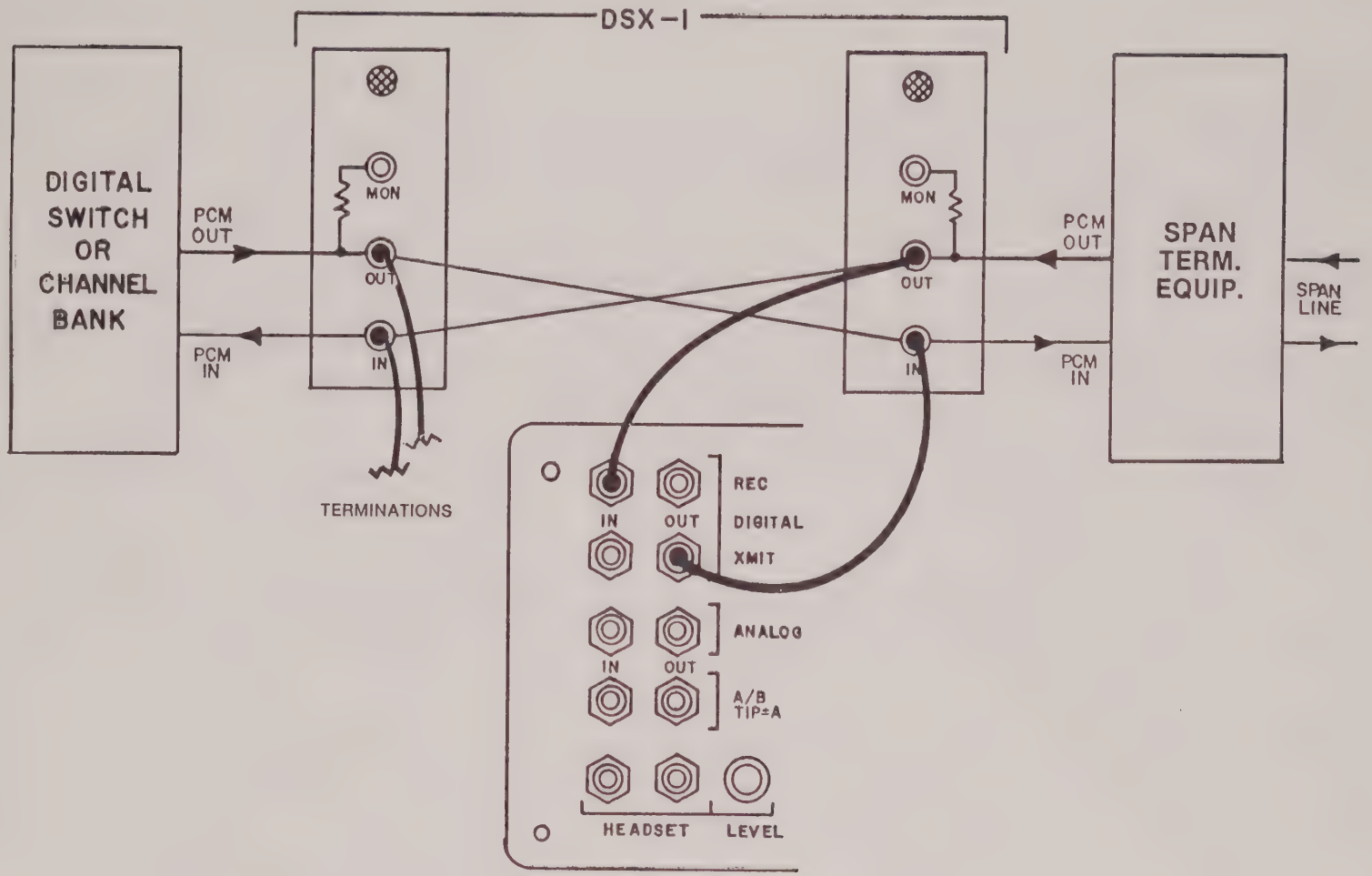


Figure 5-10

5.3 IN-SERVICE TESTING

WARNING

Check channel status before performing any In-service test to prevent accidental traffic loss.

5.3.1 Monitor Near End/Outgoing Trunks -- T1 (T308)

a. Purpose

To measure channel parameters of outgoing trunks.

b. Initial Setup

The T308 should be configured with the following parameter settings ("*" means operator selected):

MODE: **REC** OPTION: **MEASURE** MEASURE OPTION: **LINE or CHANNEL**
CODING: **NORM** CHAN. NUMBERING: **D3/D4** CH: *

Ensure the alphanumeric display shows the following before connecting to the T-carrier system:

FRAME=0000 BPV=NO RESET=^							
MODE	CH	FREQ	LEVEL	SIGNALING	SRC	ALM	FRAME

PLEASE WAIT, FRAMING ERRORS PRESENT							
MODE	CH	FREQ	LEVEL	SIGNALING	SRC	ALM	FRAME

In unfamiliar with the setup procedure for the above parameters, refer to section 4.2, page 4-1.

c. Connecting to the T1 System

Figure 5-11, below, shows the connections between the T308 and the T1 Digital Switch or Channel Bank MONITOR jack. An external Transmission Measuring Set (TMS) and/or Signaling Set can then be connected to the ANALOG OUT and/or A/B OUT jacks on the T308.

MONITOR NEAR END/OUTGOING TRUNKS -- T1
(RECEIVE MODE)
IN-SERVICE TESTING ON WORKING SYSTEM

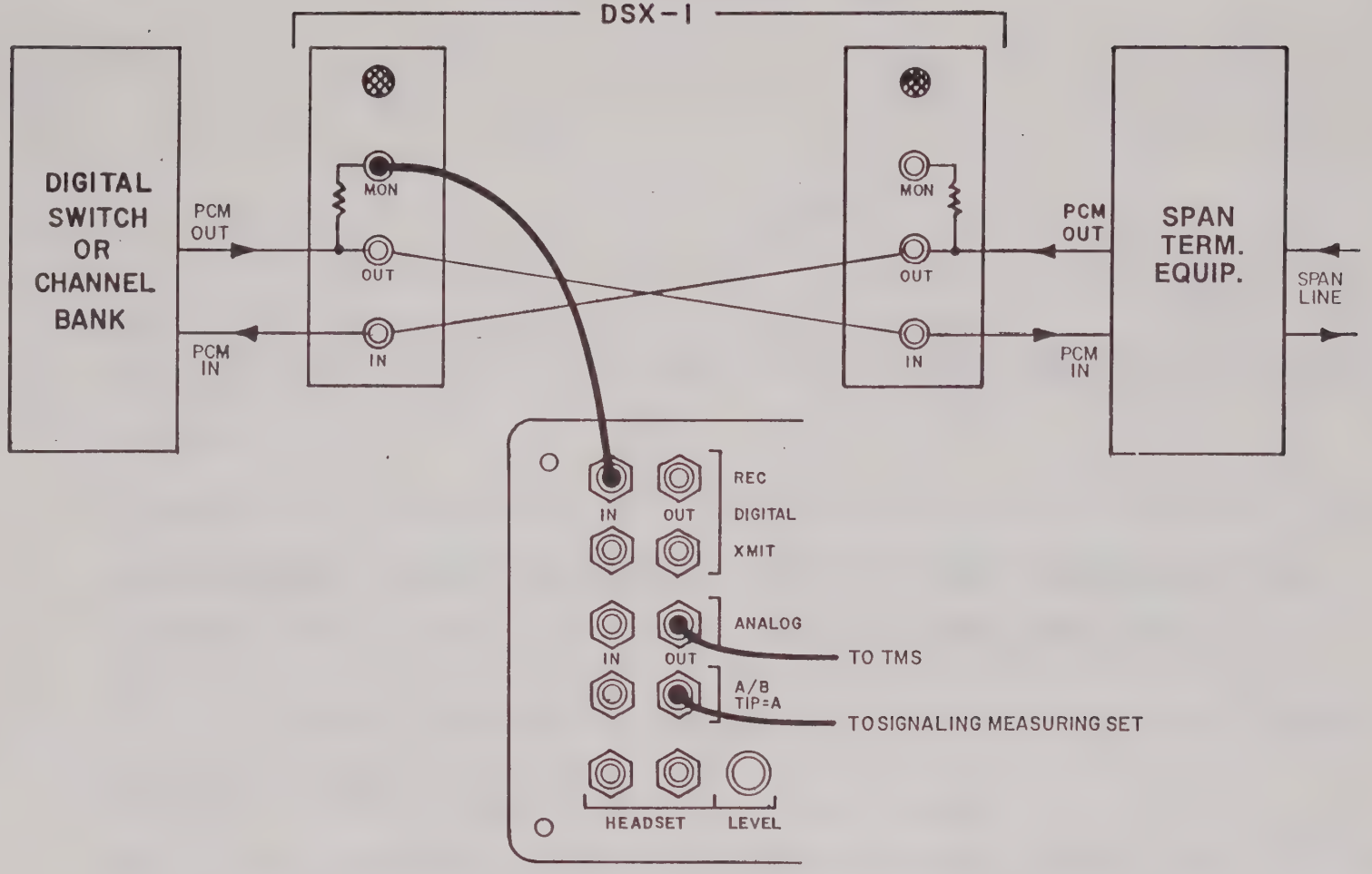


Figure 5-11

5.3.2 Monitor Near End/Incoming Trunks — T1 (T308)

a. Purpose

To measure channel parameters on incoming trunks.

b. Initial Setup

The T308 should be configured with the following parameter settings ("*" means operator selected):

MODE: **REC** OPTION: **MEASURE** MEASURE OPTION: **LINE or CHANNEL**
CODING: **NORM** CHAN. NUMBERING: **D3/D4** CH: *

Ensure the alphanumeric display shows the following before connecting to the T-carrier system:

FRAME=0000 BPV=NO RESET=^							
MODE	CH	FREQ	LEVEL	SIGNALING	SRC	ALM	FRAME

PLEASE WAIT, FRAMING ERRORS PRESENT							
MODE	CH	FREQ	LEVEL	SIGNALING	SRC	ALM	FRAME

In unfamiliar with the setup procedure for the above parameters, refer to section 4.2, page 4-1.

c. Connecting to the T1 System

Figure 5-12, below, shows the connections between the T308 and the Span Terminating Equipment MONITOR jack. An external Transmission Measuring Set (TMS) and/or Signaling Set can then be connected to the ANALOG OUT and/or A/B OUT jacks on the T308.

MONITOR NEAR END/INCOMING TRUNKS -- T1
(RECEIVE MODE)
IN-SERVICE TESTING ON WORKING SYSTEM

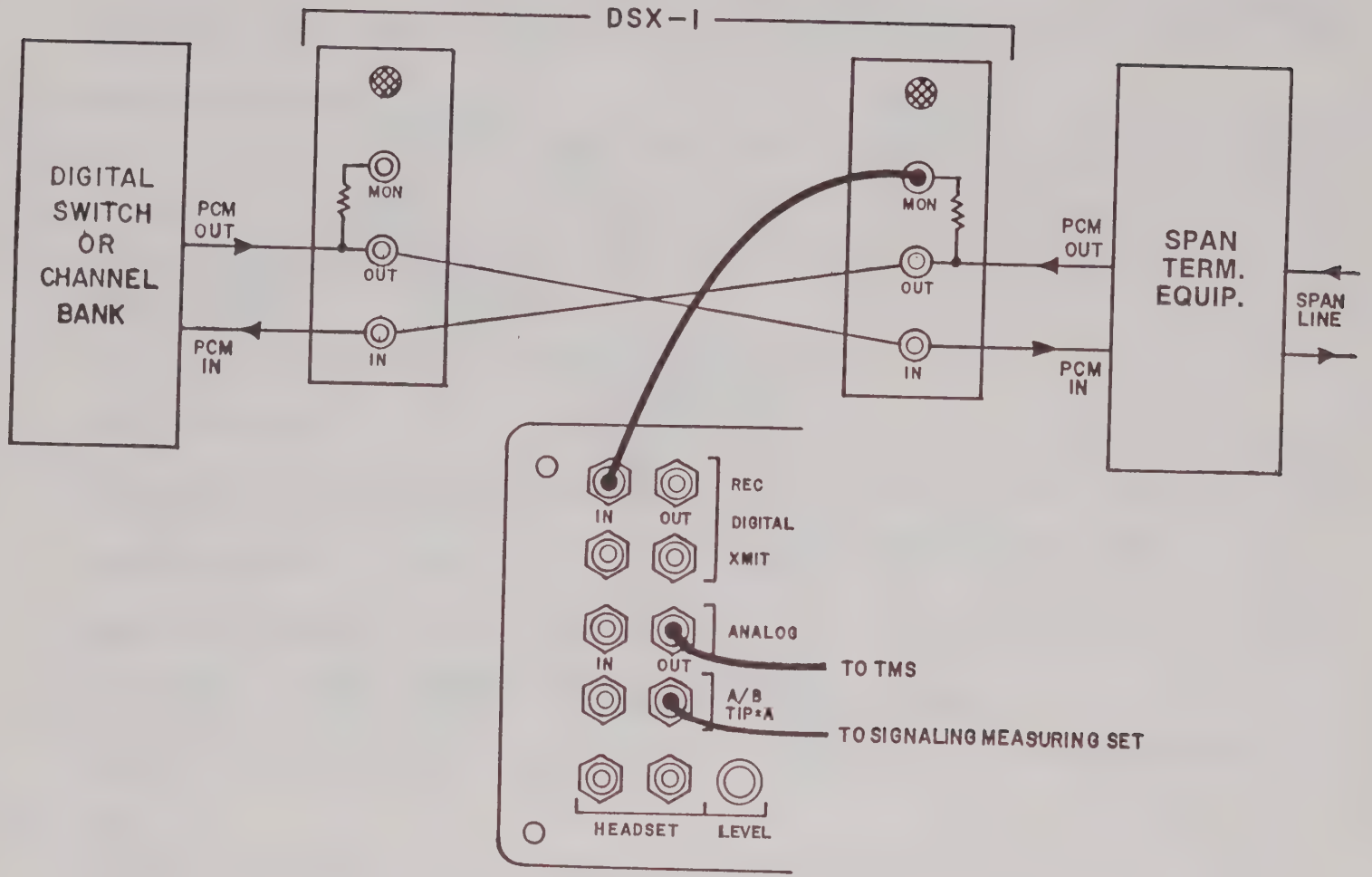


Figure 5-12

5.3.3 Bidirectional Line Monitor Test -- T1C (T308/T350)

NOTE: THIS TEST REQUIRES A T308 EQUIPPED WITH A T350 T1C MULTIPLEXER (T308-05)

a. Purpose

To observe the status of DS1C lines before an in-service test is performed.

b. T308 Setup

The T308 should be configured with the following parameter settings ("*" means operator selected):

MODE: **REC** OPTION: **MEASURE** MEASURE OPTION: **LINE or CHANNEL**
CODING: **NORM** CHAN. NUMBERING: **D3/D4** CH: *

Ensure the alphanumeric display shows the following before connecting to the T-carrier system:

FRAME=0000 BPV=NO RESET=^ PLEASE WAIT, FRAMING ERRORS PRESENT

In unfamiliar with the setup procedure for the above parameters, refer to section 4.2, page 4-1.

c. T350 Configuration

Place the T350 switches in the following positions:

XMIT INPUT: **TERM** XMIT DIGROUP: *
REC INPUT: **TERM** REC DIGROUP: *
MODE: **ORIG** REM: **OFF** BPV: **OFF**

d. Connecting to the T1C System

Figure 5-13, below, shows the connections between the T350 and the MONITOR jacks at each end.

e. Additional Information

The status of the T1C signal can be observed by viewing the T350 FRAME, BPV, REM and PCM status LEDs. The top row of indicators display the outgoing status, while the lower indicators display the INCOMING status.

BIDIRECTIONAL LINE MONITOR TEST -- T1C
(RECEIVE MODE)
IN-SERVICE TESTING ON WORKING SYSTEM

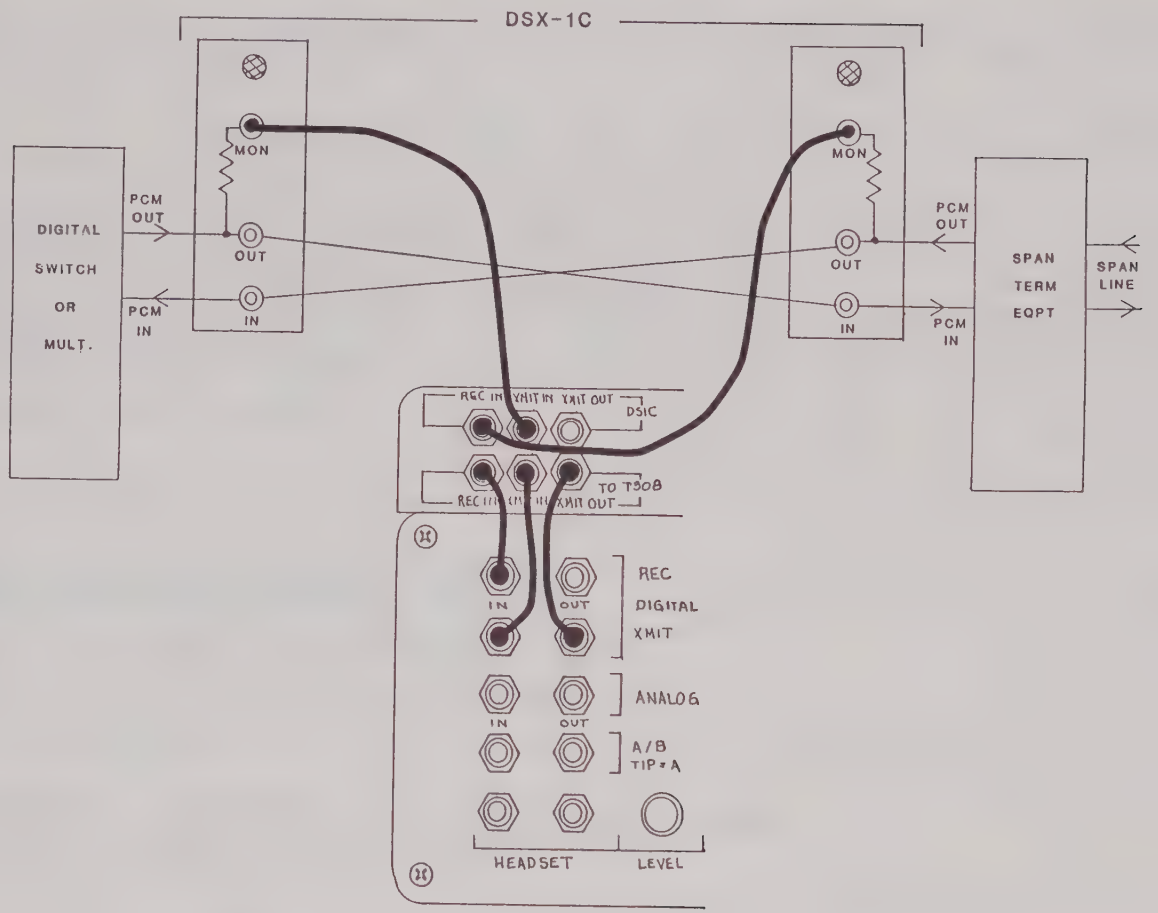


Figure 5-13

5.3.5 Send to Far End/Monitor and Receive Far End -- T1C (T308/T350)

NOTE: THIS TEST REQUIRES A T308 EQUIPPED WITH A T350 T1C MULTIPLEXER (T308-05)

a. T308 Setup

Read and perform the steps outlined in Section 5.3.5 [a] and [b]. Ensure the T308 alphanumeric display shows the correct information.

b. T350 Configuration

Place the T350 switches in the following positions:

XMIT INPUT : **TERM** XMIT DIGROUP: *
REC INPUT: **TERM** REC DIGROUP: *
MODE: **D&I** REM: **THRU** BPV: **OFF**

c. Connecting to the T1C System

It is very important to connect the T308/T350 to the system in the proper order. Failure to do so will cause traffic loss. Refer to Figure 5-15 and connect the T350 to the T1C system in the following order:

Connect Cable A -- The T308 FRAME T indicator should go out.
Coneect Cable B
Connect Cable C -- The T308 FRAME R indicator should go out.
Connect cable D -- This 100-ohm terminating plug prevents any possibility of crosstalk caused by an unterminated line.

The T308/T350 should be in frame with the T-carrier system under test (FRAME L indicator out, indicating the signal at the DIGITAL REC IN jack is in sync with the signal at the DIGITAL XMIT OUT jack.)

SEND TO FAR END/MONITOR AND RECEIVE FAR END -- T1C
(DROP & INSERT MODE)
IN-SERVICE TESTING ON WORKING SYSTEM

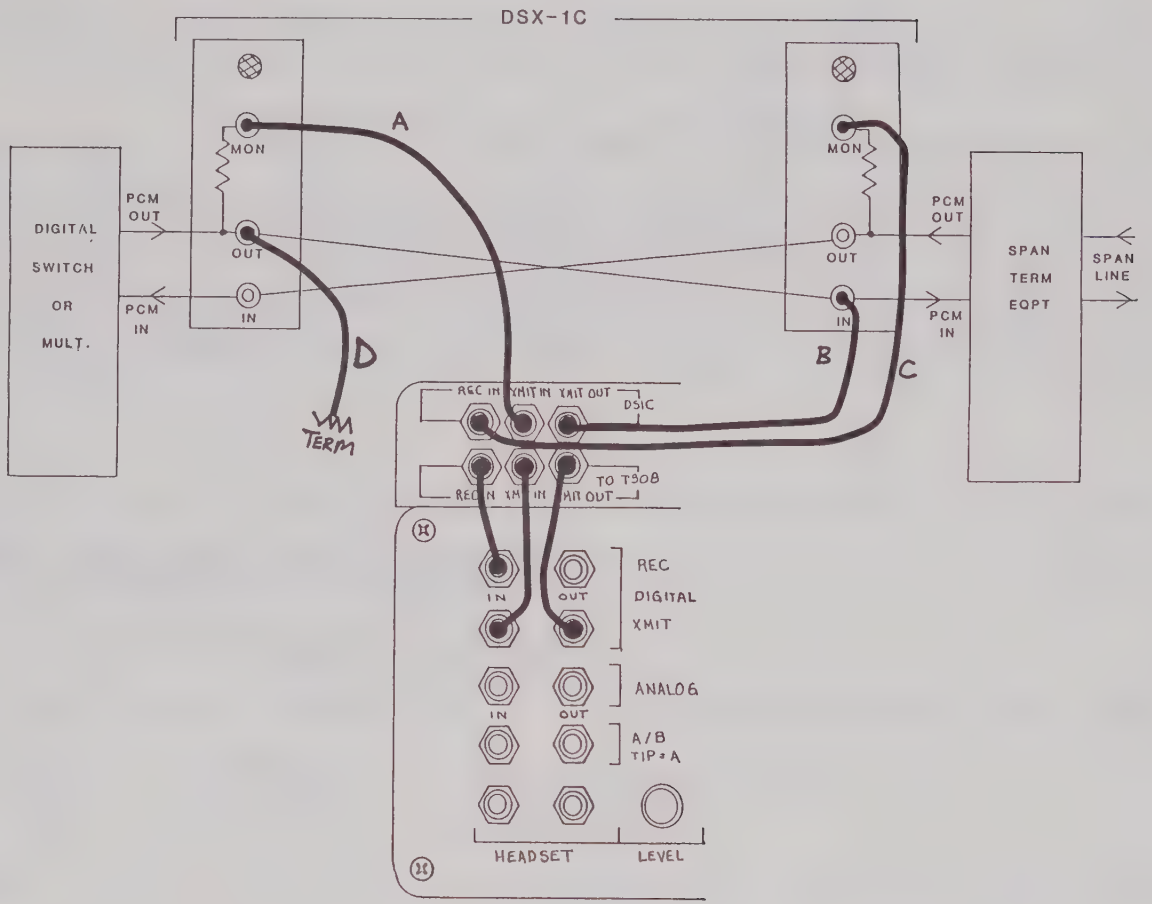


Figure 5-15

5.3.6 Send to Near End/Monitor and Receive Near End -- T1 (T308)

a. Purpose

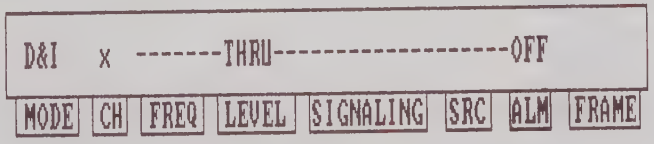
To test for VF or signaling problems present on a particular channel.

b. Initial Setup

The T308 should be configured with the following parameter settings ("*" means operator selected):

SEND: **THRU**	XMIT MODE: **D&I**	A/B SOURCE: **INT**
A BIT STATE:	B BIT STATE:	CHAN. NUMBERING: **D3/D4**
CODING: **NORM**	REC: **TRACK**	CH: *

Ensure the alphanumeric display shows the following before connecting to the T-carrier system:



If unfamiliar with the setup procedure for the above parameters, refer to section 4.2, page 4-1.

c. Connecting to the T1 System

It is very important to connect the T308 to the system in the proper order. Failure to do so will result in traffic loss. In Figure 5-16, below, the order of connections is labelled A, B, C and D. Connect the cables in the following sequence:

Connect Cable A -- The T308 FRAME T indicator should go out.
Coneect Cable B -- The T308 FRAME R indicator should go out.
Connect Cable C
Connect cable D -- This 100-ohm terminating plug prevents any possibilityy of crosstalk caused by an unterminated line.

The T308/T350 should be in frame with the T-carrier system under test (FRAME L indicator out, indicating the signal at the DIGITAL REC IN jack is in sync with the signal at the DIGITAL XMIT OUT jack.)

SEND TO NEAR END/MONITOR AND RECEIVE NEAR END -- T1
(DROP & INSERT MODE)
IN-SERVICE TESTING ON WORKING SYSTEM

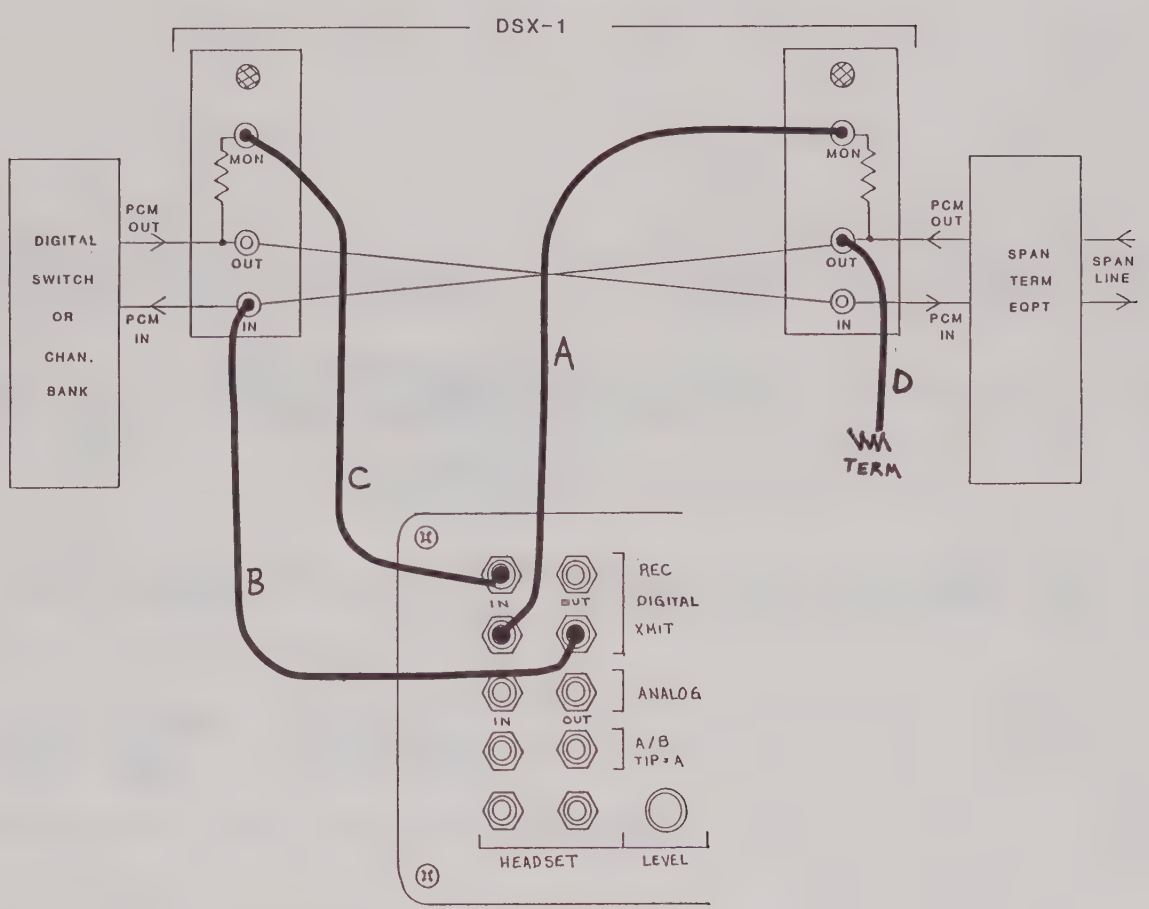


Figure 5-16

5.3.7 Send to Near End/Monitor and Receive Near End -- T1C (T308/T350)

NOTE: THIS TEST REQUIRES A T308 EQUIPPED WITH A T350 T1C MULTIPLEXER (T308-05)

a. T308 Setup

Read and perform the steps outlined in Section 5.3.6 [a] and [b]. Ensure the T308 alphanumeric display shows the correct information.

b. T350 Configuration

Place the T350 switches in the following positions:

XMIT INPUT: **TERM** XMIT DIGROUP: *
REC INPUT: **TERM** REC DIGROUP: *
MODE: **D&I** REM: **THRU** BPV: **OFF**

c. Connecting to the T1C System

It is very important to connect the T308/T350 to the system in the proper order. Failure to do so will cause traffic loss. Refer to Figure 5-17 and connect the T350 to the T1C system in the following order:

Connect Cable A -- The T308 FRAME T indicator should go out.
Coneect Cable B
Connect Cable C -- The T308 FRAME R indicator should go out.
Connect cable D -- This 100-ohm terminating plug prevents any possibility of crosstalk caused by an unterminated line.

The T308/T350 should be in frame with the T-carrier system under test (FRAME L indicator out, indicating the signal at the DIGITAL REC IN jack is in sync with the signal at the DIGITAL XMIT OUT jack.)

SEND TO NEAR END/MONITOR AND RECEIVE NEAR END -- T1C
(DROP & INSERT MODE)
IN-SERVICE TESTING ON WORKING SYSTEM

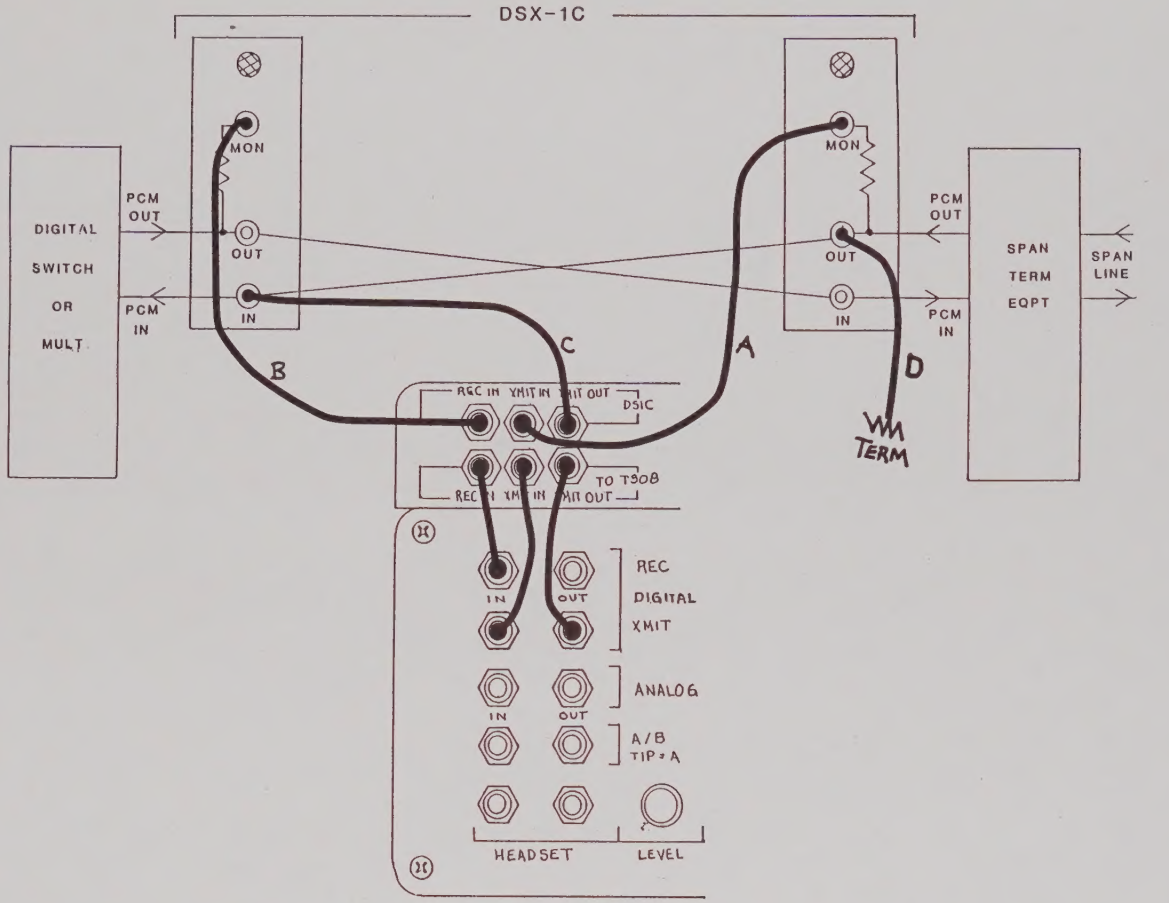


Figure 5-17

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